BOTANICAL

BIOLOGICAL ASSESSMENT

For The

SOUTHERN CALIFORNIA NATIONAL FORESTS

LAND MANAGEMENT PLAN AMENDMENT

~FINAL SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT~

Prepared by: */s/ David A. Austin* *Date 09/05/2013*
David A. Austin, Forest Biologist, San Bernardino National Forest

Input Provided by:
Deveree Kopp, Robin Eliason, Scott Eliason - San Bernardino National Forest
Kirsten Winter - Cleveland National Forest
Janet Nickerman - Angeles National Forest
Lloyd Simpson, Kevin Cooper - Los Padres National Forest

SUMMARY

This biological assessment addresses the potential effects of threatened and endangered plant species that are known to occur in the Inventory Roadless Areas affected by the proposed action.

The Forest Service proposes to amend the 2006 Land Management Plans (LMPs) in a limited in scope to address the terms of a settlement agreement between the Forest Service, State of California, and other settlement parties.

The proposed action is to modify the existing land use zones in 37 Inventoried Roadless Areas (IRAs) to include more Back Country Non-Motorized (BCNM) and Recommended Wilderness (RW) areas on the Angeles, Cleveland, Los Padres, and San Bernardino National Forests. The analysis addresses three alternatives (Alternatives 2, 2a and 3) to amend LMP land use zone allocations for the 37 IRAs in addition to taking no action (Alternative 1). Additionally, the analysis addresses two alternatives (Alternatives B and C) to amend LMP monitoring and evaluation protocols, in addition to making no changes (Alternative A).

The biological reports in the Project Record for the Final EIS for the LMP (USDA Forest Service 2006) provide the basis for this evaluation and they are incorporated here by reference. The analyses in those 2006 biological reports relative to the effects expected to botanical resources from the selected alternative are the same as Alternative 1 (No Action) for this proposal.

There are four federally-listed Threatened or Endangered (T/E) plant species with known occurrences or designated Critical Habitat (CH) in the affected IRAs or Undeveloped Areas. Two of these species are managed on the Cleveland National Forest; two are managed on the Los Padres National Forest. On the Cleveland National Forest, *Poa atropurpurea* has known occurrences and CH in the Barker Valley IRA and *Eryngium aristulatum* var. *parishii* has one known occurrence but no CH in the Cedar Creek, Eagle Peak, No Name, Sill Hill, Upper San Diego Adjacent Area. On the Los Padres National Forest, *Chlorogalum purpureum var. reductum* has designated Critical Habitat but no occurrences in the Black Mountain IRA and *Eremalche parryi* subsp. *kernensis* has occupied habitat within the Sawmill Badlands IRA.

Potential Effects from Land Use Zone Changes

In Alternative 1 (No Action) the effects to T/E species are the same as those described in the FEIS for the LMP (USDA Forest Service 2006) for the selected alternative; there would be no change from the current condition, which in 2008 was determined to result in a ***"may affect – and is likely to adversely affect"*** determination on several T/E species. *Eryngium aristulatum* var. *parishii and Eremalche parryi* subsp. *kernensis* were not known to occur on the southern California national forests at the time the Forest plans were revised in 2006. Thus, there was no determination for these species for Alternative 1. If the Cleveland and Los Padres National Forests determine there are effects to these species, consultation would be initiated.

Alternatives 2, 2a or 3 may result in fewer activities and actions that could affect T/E plants or the Primary Constituent Elements for designated Critical Habitat. The effects from Alternatives 2, 2a or 3 to occupied and designated Critical Habitat of *Poa atropurpurea*, occupied habitat of *Eryngium aristulatum* var. *parishii and Eremalche parryi subsp. kernensis* and designated

Critical Habitat of *Chlorogalum purpureum* var. *reductum* are *"**May Affect – Not Likely to Adversely Affect"**. ***The effects of Alternatives 2, 2a or 3 are expected to be wholly beneficial.***

Table 1 displays the "determinations of effects" for each T/E species and CH known to occur within one or more of the affected IRAs under Alternatives 2, 2a and 3. Section 7 Endangered Species Act (ESA) compliance will be achieved through Informal Consultation under Section 7 of the ESA.

Table 1. Summary of Effects Determinations for TES Species In the Analysis Area

Name and Listing Status	Occurrence Information	Determinations for Alternative 2, 2a and 3
Threatened & Endangered Plants		
Chlorogalum purpureum var. reductum (Camatta Canyon amole) Threatened	Black Mountain IRA (LPNF) – Critical Habitat only	No Effect for species; NLAA for CH
Eremalche parryi subsp. *kernensis* (Kern mallow) Endangered	Sawmill Badlands IRA (LPNF) occurrence only	NLAA for species
Eryngium aristulatum var. *parishii* (San Diego button-celery) Endangered	Cedar Creek, Eagle Peak, No Name, Sill Hill Upper San Diego River Adjacent Area (CNF)- occurrence only	NLAA for species
Poa atropurpurea (San Bernardino bluegrass) Endangered	Barker Valley IRA (CNF) – occurrence and Critical Habitat	NLAA for species; NLAA for CH
Determination of Effect Codes: *NE=No Effect* *NLAA=Not Likely to Adversely Affect* *NLAA-BE=Not Likely to Adversely Affect, Wholly Beneficial*		

Potential Effects from Monitoring Alternatives

Changing the monitoring methodology, in itself, is not expected to result in effects to T/E species or CH.

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INTRODUCTION

Methods

Species Considered and Species Accounts: Only those species with known occurrences in the project areas are discussed in depth in this analysis. Scientific nomenclature and common names for species referred to in this report follow those used in the LMP (USDA Forest Service 2006), with updated nomenclature.

Existing condition discussions for plant species and vegetation communities can be found in the Wilderness Evaluations (Appendix 2 of the Final SEIS) that were prepared for each of the 37 IRAs. Botanical updates to the evaluations were completed in response to relevant comments to the Draft SEIS.

Detailed species accounts and viability assessments for two of the T/E species (*Chlorogalum purpureum* var. *reductum* and *Poa atropurpurea*) were prepared during the 2006 revision of the LMP (USDA Forest Service 2006). These species accounts include information on status of populations and habitat, natural history, risks, conservation considerations, and viability analyses. New accounts were created for *Eremalche parryi* subsp. *kernensis* and *Eryngium aristulatum* var. *parishii* for this assessment. All accounts are included in Appendix B of this document.

Occurrence Information: While comprehensive botanical surveys for plant species at risk and general botanical resources have not been conducted on all acreage within the 37 IRAs, some areas have been surveyed and data collected. For the IRA analysis, information on occurrences of plant species and CH contained within the IRAs were derived from Forest Service (NRIS, GIS) and other databases (USWFS). *Eryngium aristulatum* var. *parishii* occurrence data were derived from comments to the Draft SEIS, the Consortium of California Herbaria (CCH), the California Natural Diversity Database (CNDDB) and personal communication with the Forest biologist on the Cleveland National Forest (Winter. 2013 pers. comm.). *Eremalche parryi subsp. kernensis* occurrence data were derived from comments to the Draft SEIS, the Consortium of California Herbaria (CCH), the California Natural Diversity Database (CNDDB) and personal communication with the Forest botanist on the Los Padres National Forest (Simpson. 2013 pers. comm.).

Geographical Information Systems (GIS) data were gathered from the US Fish and Wildlife Service's (FWS) Critical Habitat portal (http://criticalhabitat.fws.gov/) and Forest Service's Natural Resource Manager (NRM-TESP) which included T/E plant species locations. The California Native Plant Society Inventory of Rare and Endangered Plants (2013) was utilized and botanists from all four Forests provided input and review of this analysis. For any future site specific analysis, additional sources such as the CCH and the CNDDB would be utilized.

Current Management Direction

Applicable requirements and direction may be found in the LMP, Endangered Species Act (ESA), National Forest Management Act (NFMA), Department of Agriculture 9500-4 Regulations, Forest Service Manual (FSM), and the Southern California Conservation Strategy

(SCCS). The Proposed Action is consistent with the ESA, NFMA, and the LMP. It is also consistent with direction/guidance from applicable FWS Biological Opinions.

PURPOSE AND NEED FOR ACTION

The purpose of the proposed action is to amend the LMP land use zone allocations for selected IRAs on the Angeles (ANF), Cleveland (CNF), Los Padres (LPNF), and San Bernardino National Forests (SBNF) and to amend the LMP monitoring and evaluation protocols. This action is needed to respond to the terms of the Settlement Agreement between the Forest Service, State of California, and other settlement parties. This proposed amendment to the 2006 LMPs is limited in scope and designed to address the terms of the settlement agreement.

ALTERNATIVES CONSIDERED IN DETAIL

The Forest Service is proposing two independent and distinct actions for the proposed LMP amendment. The first component of the proposed amendment would change the land use zone (LUZ) allocations for select roadless areas on the four forests. In addition to the No Action alternative and the Proposed Action, the Forest Service identified two additional alternatives to consider in detail. One of the additional alternatives, Alternative 2a, the Preferred Alternative, was developed in response to comments on the Draft SEIS.

The second part of the proposed amendment would modify the monitoring and evaluation requirements adopted in the LMP. The monitoring and evaluation requirements for implementation of forest plans as required by 36 CFR 219.11(d) are typically designed around the forest plan goals, objectives, and standards in order to periodically determine and evaluate the effects of management practices. Forest Service policy does not require the analysis of alternative monitoring methods but monitoring alternatives are included in this SEIS as required by the Settlement Agreement. The Forest Service developed two monitoring alternatives for consideration in detail, in addition to the No Action alternative.

The LUZ and monitoring alternatives are separated to provide clarity in the analysis and disclosure of effects. The land use zone allocations apply to a select group of roadless areas, and will affect the uses of those specific lands. The analysis will focus on how the resources on those lands could change under the different land use zone allocations proposed by the alternatives.

The monitoring and evaluation protocols apply forest wide, not just to the set of IRAs being analyzed. They meet or exceed agency requirements for monitoring, and will influence the implementation of plan standards and guidelines within all resource areas. The analysis of the monitoring and evaluation protocols will focus on how the alternative strategies affect funding, staffing and economic efficiency.

DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

The proposed action is to modify the existing land use zones in the identified IRAs to include more Back Country Non-Motorized (BCNM) and Recommended Wilderness (RW) areas on the four National Forests.

It is important to note that any alternative that proposes additional areas as recommended wilderness should be considered a preliminary administrative recommendation as it relates to eventual wilderness designation. If an alternative that includes recommended wilderness is adopted, the preliminary administrative recommendation will receive further review and possible modification by the Chief of the Forest Service, Secretary of Agriculture, and the President of the United States. The Congress has reserved the authority to make final decisions on wilderness designation.

Table 2 displays the IRAs that are being evaluated under this proposed action.

Table 2. IRAS within the four southern California National Forests	
FOREST	**INVENTORIED ROADLESS AREAS**
Angeles	Fish Canyon, Red Mountain, Salt Creek, Tule, West Fork, Westfork
Cleveland	Barker Valley, Caliente, Cedar Creek*, Coldwater, Eagle Peak, Ladd, No Name, Sill Hill, Trabuco, Upper San Diego River Gorge*
Los Padres	Antimony, Black Mountain, Cuyama, Diablo, Dry Lakes, Fox Mountain, Garcia Mountain, Juncal, Machesna Mountain, Malduce Buckhorn, Quatal, Sawmill Badlands, Spoor Canyon, Tequepis, White Ledge
San Bernardino	Cactus Springs B, Cucamonga B, Cucamonga C, Pyramid Peak A, Raywood Flats B
Angeles and Los Padres	Sespe Frazier
*Cedar Creek and Upper San Diego River Gorge are areas the public proposed for wilderness designation and were analyzed for potential wilderness designation in the 2006 FEIS supporting the revised forest plans and will be considered and counted as IRAs in this analysis. **However, the Roadless Area Conservation Rule does not apply to these two areas.**	

For reference, **Table 3** displays the suitable uses for each LUZ type. Overview maps of the IRAs are displayed below; detailed maps can be found in the Final SEIS. **Appendix A** includes maps of those IRAs with known T/E species occurrences or designated Critical Habitat.

Land Use Zone Allocations

Four potential actions are being considered: No Action (Alternative 1), the Proposed Action (Alternative 2), the Preferred Alternative (Alternative 2a), and an alternative that would maximize the designation of recommended wilderness areas (Alternative 3).

Alternative 1 - No Action

Under the No Action alternative, the current land use zones would be implemented for the four southern California national forests. The maps for the No Action alternative (in the Final SEISAppendix 1 and available online) reflect the current LUZ allocations adopted as part of the LMP Alternative 4a.

Alternative 2 - The Proposed Action

The Proposed Action responds to the Settlement Agreement by re-zoning the majority of the land use zone allocations within the IRAs listed in the Settlement Agreement (Final SEIS Appendix 2) to Back Country Non-Motorized (BCNM) and Recommended Wilderness (RW). The allocations are based on the wilderness evaluations for the IRAs that were updated concurrent with this analysis. Appendix 2 in the Final SEIS provides that updated analysis. Two of the areas in the Final SEIS Appendix 2 are undeveloped areas proposed by the public and evaluated for wilderness potential in the 2006 LMP revision but are not Inventoried Roadless Area per the Roadless Area Conservation Rule (RACR). Nevertheless, for the purpose of aiding readability of this environmental document, narrative or tables refer to these areas collectively as IRAs. The wilderness evaluations identify the capability, suitability, and need for wilderness associated with each IRA. Based on this updated analysis, the Proposed Action land use zones were developed using the following guidelines:

- Existing RW land use zones were maintained.
- Areas within the settlement IRAs that are capable and available for wilderness in areas of high need were allocated to RW. Capable and available areas adjacent to the settlement IRAs were also included in the RW allocation when inclusion created a more logical wilderness area boundary.
- Areas within the settlements IRAs that are capable and available for wilderness in areas of low or moderate need were allocated to BCNM.
- Areas within the settlements IRAs not capable or suitable for wilderness were allocated to other land use zones as follows:
    - Motorized access on existing authorized roads and trails was maintained, with 100 foot buffers applied on each side of county and forest roads, and 300 foot buffers applied on each side of state highways. The current forest plan LUZ allocation for these roaded areas will not change as part of this amendment and are a mix of Back Country (BC) or Back Country Motorized Use Restricted (BCMUR).
    - Existing Developed Area Interface (DAI) zones were maintained around structures/facilities to provide for fuel treatments. DAI zones in chaparral fuels were set a minimum distance of 300 feet from structures, with larger DAI zones in timbered areas.
    - Fuel breaks buffers were set at 300 feet if there was a National Forest System (NFS) road or motorized trail associated with the fuel break.
    - Facilities authorized under permit such as communication sites and powerlines not already in BCNM or RW were buffered to maintain the current allocations.
- Critical Biological (CB) zones were maintained or included in RW.

In response to scoping, the following incremental changes were incorporated into the proposed action:

- Several Forest Service trails in the proposed Salt Creek and Fish Canyon RW areas were removed from the proposed action to allow continued use by mountain bikes.
- The corridor along the Gold Hill road in the Sespe-Frazier IRA was widened to maintain suitable LUZ allocations for an Off-Highway Vehicle (OHV) trail parallel to the road.
- The Ribbonwood Equestrian camp ground in the Cactus Springs B IRA was removed from the proposed action to maintain the current LUZ.
- The following standard is proposed for the Los Padres LMP:

    - LPNF S2 – The Los Padres Condor Range and River Protection Act of 1992 states, "The Toad Springs road corridor delineated as potential wilderness shall remain open to off-road traffic until construction of an alternate route, which bypasses this area, is completed. These potential wilderness lands shall be automatically incorporated in and managed as part of the Chumash Wilderness upon publication of a notice in the Federal Register." In furtherance of this act, the Forest Supervisor may approve an alternate route consistent with LMP standards with the following exception:
        - Off-highway vehicle use of forest system trails is considered suitable for BCMUR and BCNM land use zone allocations if the trail construction is conditioned on permanent closure of the Toad Springs trail.
- Projects currently under contract, permit, or other authorizing instrument (such as grazing permits and electronic sites) will not be affected by the decision; however, projects may be modified to adopt all or part of this direction where Forest Service managers deem appropriate. Re-issuance of existing authorizations will be treated as new decisions, which must be consistent with any new direction adopted as part of the amendment.

Several corrections were made to Alternative 2 in response to comments on the Draft SEIS. These include small adjustments in the LUZ boundaries to exclude a utility corridor in the West Fork IRA and a permitted ski area facility in the Cucamonga B IRA.

Alternative 2a - The Preferred Alternative

Alternative 2a includes the design criteria and features of Alternative 2, with the following modifications to the land use zones:

- The proposed BCNM land use zone was reduced slightly in the Black Mountain IRA to accommodate the Quail Trail relocation.
- The proposed RW land use zone for the Salt Creek and Fish Canyon IRAs was expanded to include two adjacent undeveloped areas along the abandoned "oil well" road, and the Sawtooth/Warm Springs Mountain Road.
- The proposed RW land use zone for Raywood Flat IRA was expanded to include the area around the South Fork of the Whitewater River while leaving a corridor of BCMUR along road 2S01.
- The proposed RW land use zone along the San Diego River undeveloped area was adjusted to provide a more manageable boundary.
- The proposed RW land use zone for the Cedar Creek undeveloped area was expanded to the east (up to the boundary of the Inaja Reservation). The land use zone allocation around the Cedar Creek Road was left as BC.
- The proposed RW land use zone adjacent to the Eagle Peak IRA was reduced slightly to accommodate future trail head development to the Three Sisters area.
- The land use zone for the King Creek Research Natural Area in the Sill Hill IRA was changed to RW.

These modifications are very focused and developed in response to comments on the Draft SEIS and to new information. All other aspects of Alternative 2a are the same as Alternative 2. The scope of Alternative 2a is within the scope of actions analyzed in the Draft SEIS.

Alternative 3 - Recommended Wilderness Emphasis

Alternative 3 was developed in response to comments from groups that wanted more recommended wilderness. Alternative 3 rezones the majority of the land use zones allocated within the IRAs to RW as shown on the maps in the Final SEIS Appendix 1. The same guidelines used to avoid conflicting uses in Alternative 2 apply to Alternative 3 with the following exception:

- Forest Service non-motorized trails were not excluded from RW allocations in any area.

The following two areas were not allocated to RW for the reasons described:

- Portions of the Sespe-Frazier IRA were not included in the RW allocations due to the extensive road system within the IRA but rather were allocated to BCNM.
- The Ladd IRA was not allocated to RW because it is bisected by a major utility corridor. That same corridor bisects the Coldwater IRA, and the area north of the corridor was not allocated to RW because of its small size.

The additional RW allocations outside of but adjacent to IRA boundaries in Alternative 2a are incorporated into Alternative 3 for the Final SEIS. In addition, an undeveloped area adjacent to the Sespe-Frazier IRA was added to Alternative 3 in response to comments. An area around Wheeler Springs on the south end of the Dry Lakes IRA was left in the DAI land use zone to allow for a community protection area.

Connected Actions

The LMP classifies the Recreation Opportunity Spectrum (ROS) and Scenic Integrity Objectives (SIOs) for specific areas of the forests based on the allocation of land use zones. A decision to change the land use zone allocations as proposed in Alternatives 2, 2a, and 3 would trigger a change in the ROS and SIOs.

Monitoring and Evaluation Requirements

The secondary component of the proposal is to amend LMP monitoring and evaluation protocols. There are three alternatives, including not amending the current monitoring and evaluation requirements. The monitoring alternatives considered in this document are applicable across the entire National Forests of Southern CA, not just the IRAs included in this evaluation.

Alternative A - No Action

There would be no change to the current monitoring requirements under the No Action alternative. The current monitoring requirements are found in LMP Part 3, Appendix C.

Alternative B - The Proposed Action

The proposed action includes monitoring and evaluation requirements described in detail in the Final SEIS Appendix 3. The monitoring proposed action was incrementally changed after scoping to focus on the monitoring questions and indicators and less on the specific details of implementation. The proposed action monitoring and evaluation requirements are based on the current monitoring and evaluation requirements with the following revisions:

- Update Part 1 monitoring questions to:
    - Add a question for mortality risk.

- Add a question for riparian condition
- Drop the question for general forest activities.
- Add an indicator for unauthorized roads and trails.
- Clarify and update several indicators to reflect current inventory methodology.

- Add a section that describes the implementation of Part 1 monitoring in greater detail.
- Expand the description of Part 3 monitoring to provide more detail on how to select projects for monitoring.

Alternative C - Extensive Monitoring

Alternative C, described in detail in the Final SEIS Appendix 3, provides for more intensive inventories and surveys than the current monitoring plan or Alternative B. It is based in part on the concepts promoted by the conservation groups during scoping.

Alternative C follows the same general format as the Proposed Action Monitoring Alternative in that the monitoring requirements are associated with all three parts of the LMP. Alternative C would maintain the three part strategy with the following modifications. There would be more use of baseline inventories for Part 1 monitoring using a sampling approach. Under Alternative C, Part 1 focuses on monitoring effects of management relative to plan objectives, with indicators updated for current metrics. Part 2 reports accomplishment. Alternative C Part 3 would monitor more projects based on a 20% annual sample of new projects and a 20% sample of ongoing projects.

Agency Preferred Alternative

This Biological Assessment addresses all three action alternatives. LUZ Alternative 2a with Monitoring Alternative B have been identified as the preferred alternative(s).

Features Common to All Alternatives

Forest Plan direction

The proposed amendment does not change the forest wide management direction adopted in 2006. The existing LMP land use zone definitions, the suitable uses identified within the individual land use zones, and the plan standards remain as described in the current LMPs. Land use zone descriptions and suitable uses are found in Part 2 of the LMPs, forest specific plan standards are also in Part 2, and plan standards applicable to all four forests are found in Part 3.

Existing direction that will not change also includes the Regional Forester's decisions for recommended Wild and Scenic Rivers, Research Natural Areas, and Special Interest Areas. These decisions are outlined in the individual Record of Decision for each forest, and also described in Part 2 of the LMPs.

Implementation of the 2001 Roadless Area Conservation Rule

The proposed amendment will not affect the implementation of the 2001 Roadless Area Conservation Rule (36 CFR Part 294 Subpart B). The Roadless Area Conservation Rule

(RACR) was published in the Federal Register on January 12, 2001 (66 FR 3244). Ten lawsuits were filed challenging the rule. In May 2001, a preliminary injunction barring implementation of the rule was issued by a federal district court in Idaho. The Ninth Circuit Court of Appeals reversed that ruling, and the RACR became effective in April 2003.

In July 2003, a federal district court in Wyoming upheld a State of Wyoming challenge to the RACR holding that promulgation of the RACR was procedurally flawed under the National Environmental Policy Act and substantively illegal under the Wilderness Act. The court permanently enjoined the rule. The decision was appealed to the Tenth Circuit Court of Appeals, but the court declared the case moot and vacated the Wyoming order after the 2005 State Petitions Rule was promulgated.

The LMPs for the four forests were issued when the 2005 State Petitions Rule was in effect. Under the State Petitions Rule, the land use zone allocations made in the LMPs included designations that allowed road construction and reconstruction in approximately 28% of the one million acres of IRAs within the four forests.

The 2005 State Petitions Rule triggered two additional lawsuits in a district court of California. On September 20, 2006, the California court set aside the State Petitions Rule, and reinstated the RACR. The decision was appealed and on August 5, 2009, the appellate court affirmed the district court's ruling.

In response to the reinstatement of the RACR, the State of Wyoming filed a second lawsuit (*Wyoming II*) challenging the RACR. On August 12, 2008, the Wyoming court again set aside and enjoined the RACR. The Wyoming decision placed the Forest Service in a conundrum of trying to comply with the California court's order *to follow* the RACR and the Wyoming court's order *to not follow* the RACR. The government filed an appeal on August 13, 2009 to the Tenth Circuit Court.

On October 21, 2011, the 10th Circuit Court of Appeals reversed the Wyoming District Court and upheld USDA's 2001 Roadless Rule in Wyoming v. USDA. On March 2, 2012, Judge Brimmer (Wyoming) lifted his injunction on the 2001 Roadless Rule. Although Wyoming petitioned the Supreme Court for review, the petition for a writ of certiorari was denied by the Supreme Court on October 1, 2012.

Under the RACR, new road construction and reconstruction are generally prohibited in IRAs, and timber harvest is only permitted under a few limited exceptions. All LMP direction allowing road reconstruction and reconstruction in IRAs is superseded by the 2001 Roadless Rule without further agency action, and Forest Service project decisions will be guided by the LMP direction as modified by the RACR.

Table 3. Suitable Uses Within Land Use Zones and the Roadless Rule (RACR)

Activity or Use	Land Use Zone						IRA/RACR 36 CFR 294 Subpart B
	Developed Areas Interface (DAI)	Back Country (BC)	Back Country Motorized Use Restricted (BCMUR)	Back Country Non-Motorized (BCNM)	Critical Biological (CB)	Recommended Wilderness/ Wilderness (RW/W)	
Resource Management							
Rangeland Type Conversion for Forage production	Not Suitable	Not Suitable	Not Suitable	Not Suitable	Not Suitable	Not Suitable	Suitable if activity meets prohibitions[1]
Restoration of Vegetation Condition	Suitable	Suitable	Suitable	Suitable	*By Exception	Suitable	Suitable if activity meets prohibitions[1]
Disposal of National Forest System lands	*By Exception	*By Exception	*By Exception	*By Exception	*By Exception	Not Suitable	Suitable
Public Use and Enjoyment							
Recreation Residence Tracts	Designated Areas	Designated Areas	Not Suitable	Not Suitable	Not Suitable	Not Suitable	Suitable if activity meets prohibitions[1]
Organization Camps	Designated Areas	Designated Areas	Not Suitable	Not Suitable	Not Suitable	Not Suitable	Suitable if activity meets prohibitions[1]
Lodges, Resorts and Clubs	Designated Areas	Designated Areas	Not Suitable	Not Suitable	Not Suitable	Not Suitable	Suitable if activity meets prohibitions[1]
Hunting and Fishing	Regulated by the State (CDFG)	Regulated by the State (CDFG)	Regulated by the State (CDFG)	Regulated by the State (CDFG)	Regulated by the State (CDFG)	Regulated by the State (CDFG)	Regulated by the State (CDFG)
Target Shooting Areas	*By Exception	Designated Areas	Designated Areas	Designated Areas	Not Suitable	Not Suitable	Suitable if activity meets prohibitions[1]
Public Motorized Use on Forest System Roads	Suitable	Suitable	Not Suitable	Not Suitable	Not Suitable	Not Suitable	Suitable[2]
Authorized Motorized Use	Suitable	Suitable	Suitable	*By Exception	*By Exception	*By Exception	Suitable
Off-Highway Vehicle Use on Forest System Roads and Trails	Designated Roads and Trails	Designated Roads and Trails	Not Suitable	Not Suitable	Not Suitable	Not Suitable	Suitable[2]
Public Motorized Use off Forest System	Suitable in Designated	Suitable in Designated	Not Suitable	Not Suitable	Not Suitable	Not Suitable	Suitable[2]

Table 3. Suitable Uses Within Land Use Zones and the Roadless Rule (RACR)

Activity or Use	Land Use Zone						IRA/RACR 36 CFR 294 Subpart B
	Developed Areas Interface (DAI)	**Back Country (BC)**	**Back Country Motorized Use Restricted (BCMUR)**	**Back Country Non-Motorized (BCNM)**	**Critical Biological (CB)**	**Recommended Wilderness/ Wilderness (RW/W)**	
Roads and Trails	Open Areas	Open Areas					
Mountain Bikes Forest System Roads and Trails	Unless Otherwise Restricted	Unless Otherwise Restricted	Unless Otherwise Restricted	Unless Otherwise Restricted	Unless Otherwise Restricted	Not Suitable	Suitable[2]
Dispersed Area Camping	Suitable Unless Otherwise Restricted	Suitable Unless Otherwise Restricted	Suitable Unless Otherwise Restricted	Suitable Unless Otherwise Restricted	Not Suitable	Suitable Unless Otherwise Restricted	Suitable[3]
Commodity and Commercial Uses							
(Non-Rec) Special Uses: Low Intensity Land Use	Suitable	Suitable	Suitable	*By Exception	*By Exception	*By Exception	Suitable if activity meets prohibitions[1]
Communication Sites	Designated Areas	Designated Areas	Designated Areas	*By Exception	*By Exception	Not Suitable	Suitable if activity meets prohibitions[1]
Livestock Grazing	Designated Areas	Designated Areas	Designated Areas	Designated Areas	Not Suitable	Designated Areas	Suitable
Major Transportation Corridors	Designated Areas	Designated Areas	Not Suitable	Not Suitable	Not Suitable	Not Suitable	Not suitable
Major Utility Corridors	Designated Areas	Designated Areas	Designated Areas	Not Suitable	Not Suitable	Not Suitable	Suitable if activity meets prohibitions[1]
Road construction or re-construction	Suitable	Suitable	Suitable for authorized use	Not Suitable	Not Suitable	Not Suitable	By Exception[4]
Developed Facilities	Suitable	Suitable	*By Exception	Not Suitable	Not Suitable	Not Suitable	Suitable if activity meets prohibitions[1]
Oil and Gas Exploration and Development Areas	Suitable	Suitable	*By Exception	*By Exception	Not Suitable	Not Suitable	Suitable if activity meets prohibitions[1]
Minerals Resources Exploration and Development	Suitable	Suitable	*By Exception	*By Exception	*By Exception	Not Suitable	Suitable if activity meets prohibitions[1]

Table 3. Suitable Uses Within Land Use Zones and the Roadless Rule (RACR)

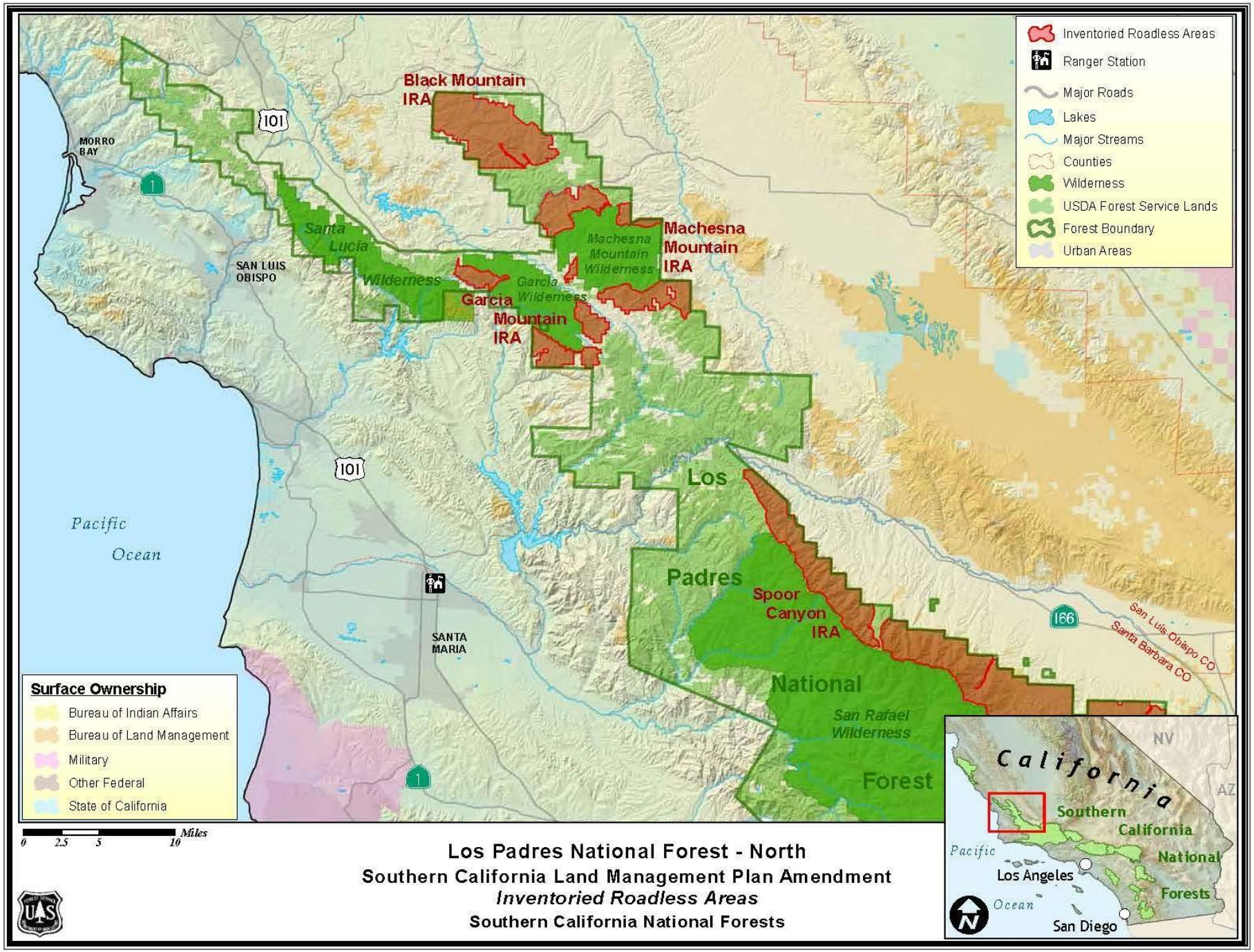
Activity or Use	Land Use Zone						IRA/RACR 36 CFR 294 Subpart B
	Developed Areas Interface (DAI)	Back Country (BC)	Back Country Motorized Use Restricted (BCMUR)	Back Country Non-Motorized (BCNM)	Critical Biological (CB)	Recommended Wilderness/ Wilderness (RW/W)	
Renewable Energy Resources	Suitable	Suitable	*By Exception	*By Exception	Not Suitable	Not Suitable	Suitable if activity meets prohibitions[1]
Wood Products, including fuelwood harvesting	Suitable	Suitable	Suitable	Suitable	*By Exception	Not Suitable	By Exception
Special Forest Products	Suitable	Suitable	Suitable	Suitable	*By Exception	*By Exception	Suitable
Fire and Fuels Management							
Community Protection Areas	Suitable	Suitable	Suitable	Suitable	*By Exception	*By Exception	Suitable if activity meets prohibitions[1]
Fuelbreak Construction including type conversion	Suitable	Suitable	Suitable	*By Exception	*By Exception	*By Exception	Suitable if activity meets prohibitions[1]
Wildland Fire Use Strategy	Not Suitable	Not Suitable	Not Suitable	Not Suitable	Not Suitable	Not Suitable	Suitable if activity meets prohibitions[1]

* By Exception = Conditions which are not generally compatible with the land use zone but may be appropriate under certain circumstances.

[1] Suitable if the activity is currently authorized, or can be conducted using existing classified roads or trails. Timber cutting is allowed incidental to the activity (294.13((b) (2)).

[2] Subject to travel management restrictions 36 CFR 212 and 36 CFR 261

[3] Subject to forest closures 36 CFR 261


Inventoried Roadless Areas
Ranger Station
Major Roads
Lakes
Major Streams
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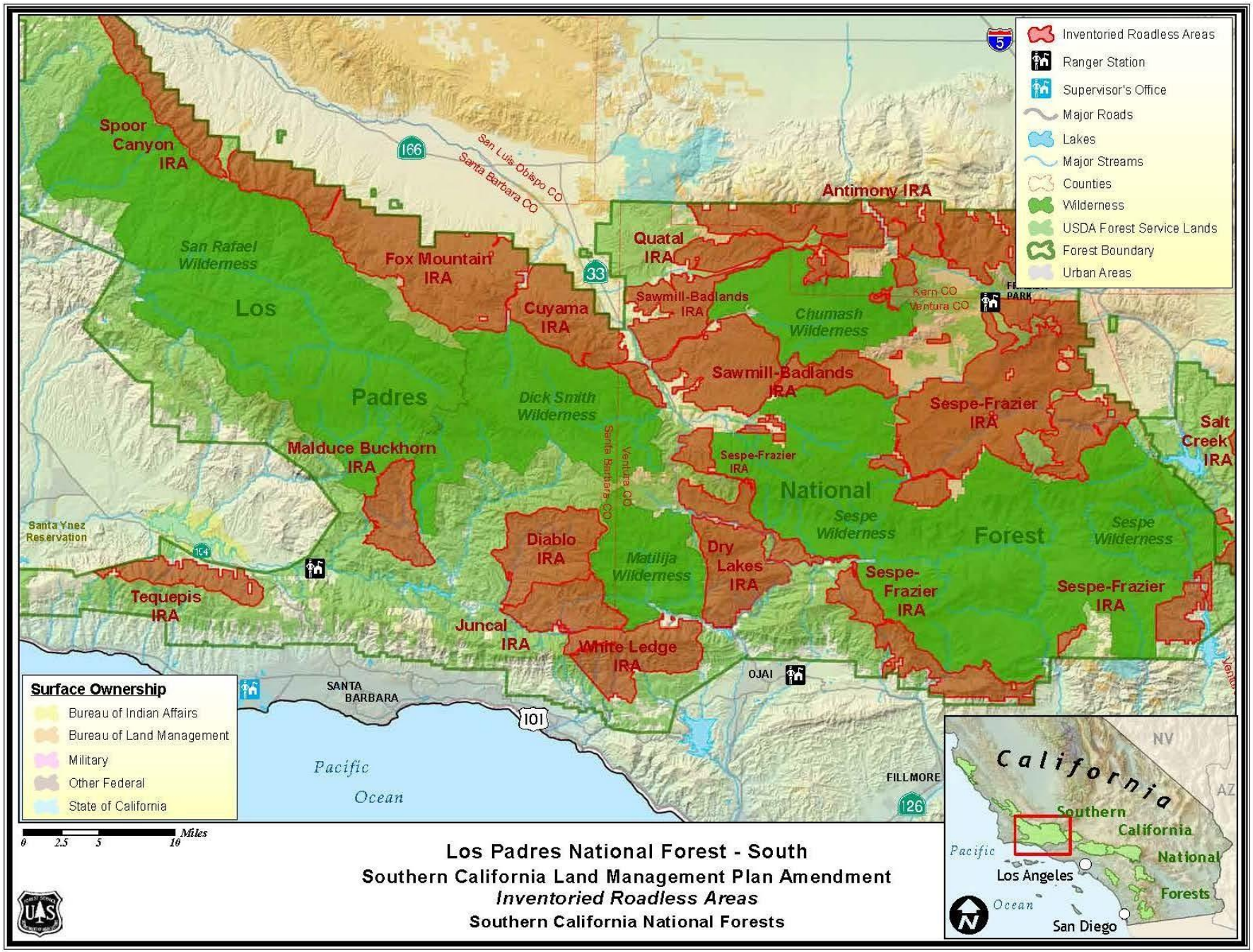
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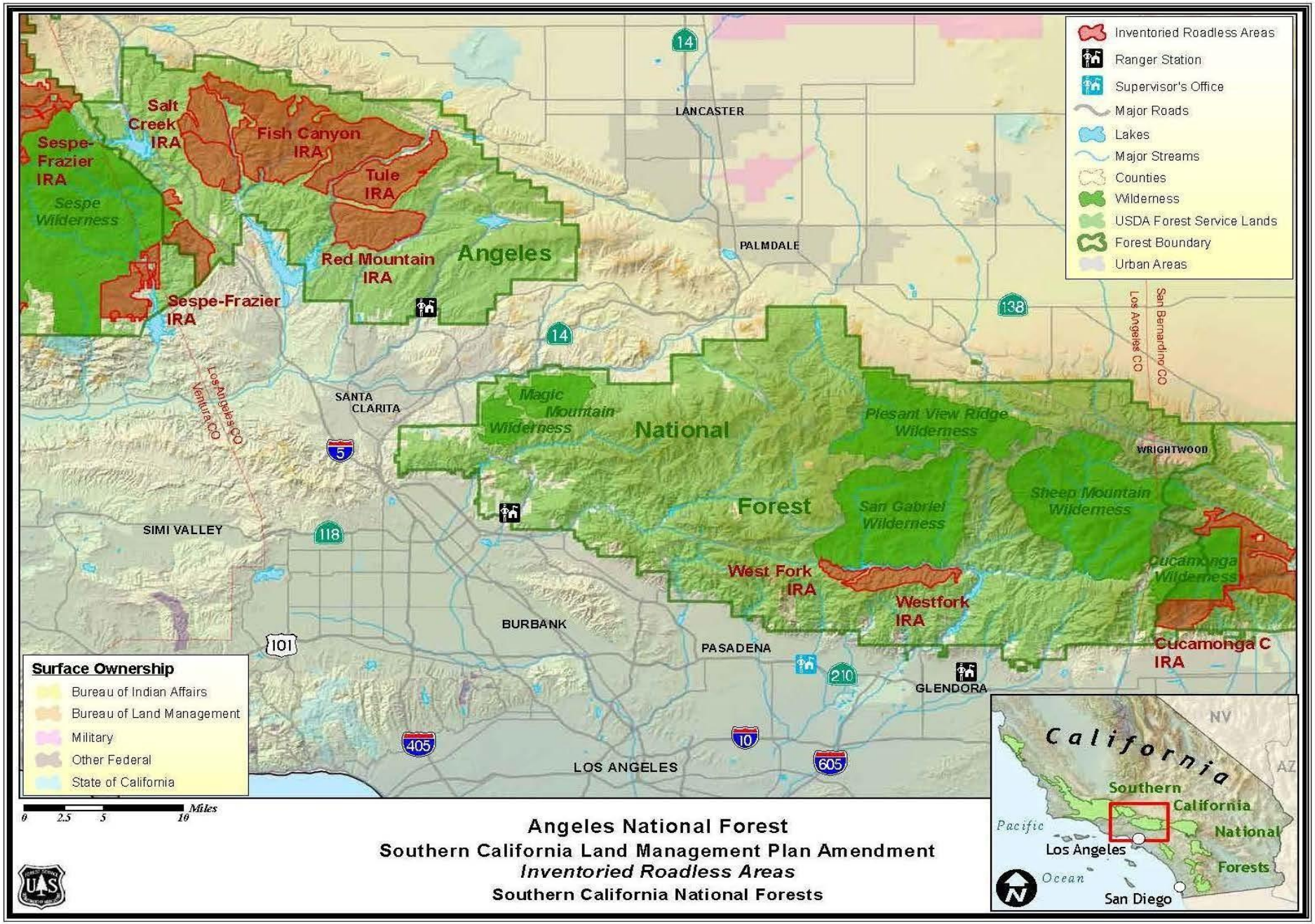
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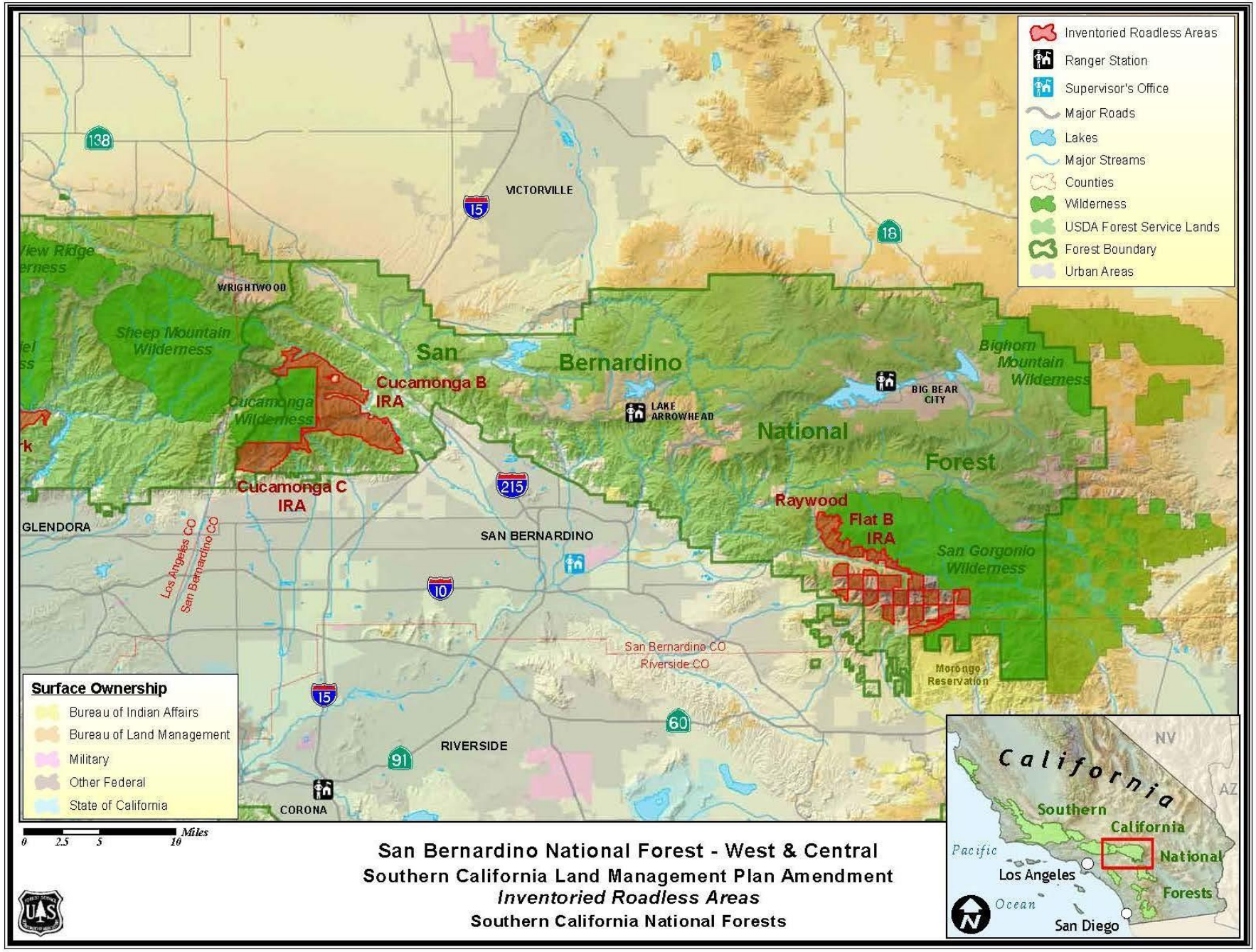
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BIG BEAR CITY
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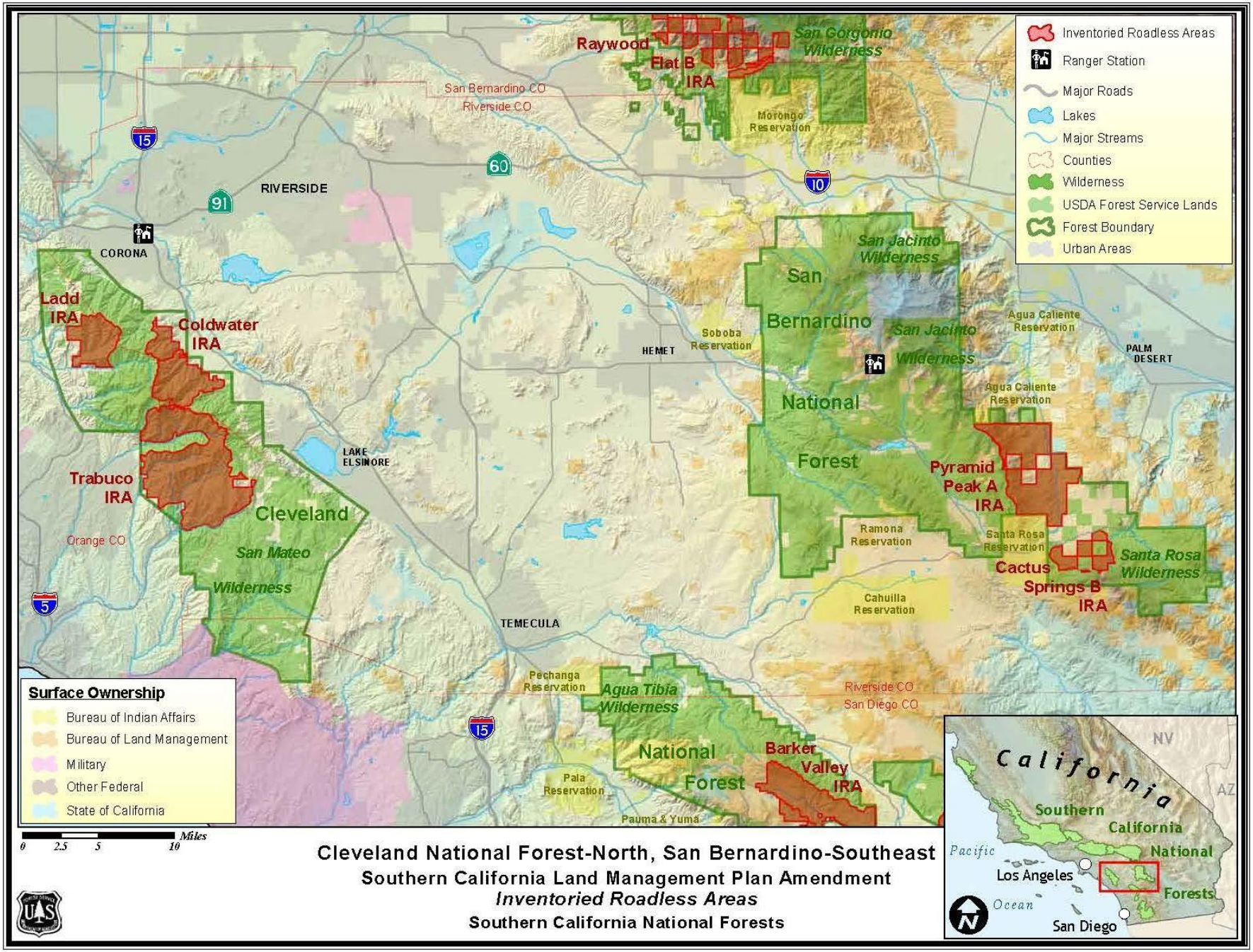
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HEMET
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Pyramid Peak A IRA
Ramona Reservation
Santa Rosa Reservation
Cactus Springs B IRA
Santa Rosa Wilderness
Cahuilla Reservation
TEMECULA
Pechanga Reservation
Agua Tibia Wilderness
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Barker Valley IRA
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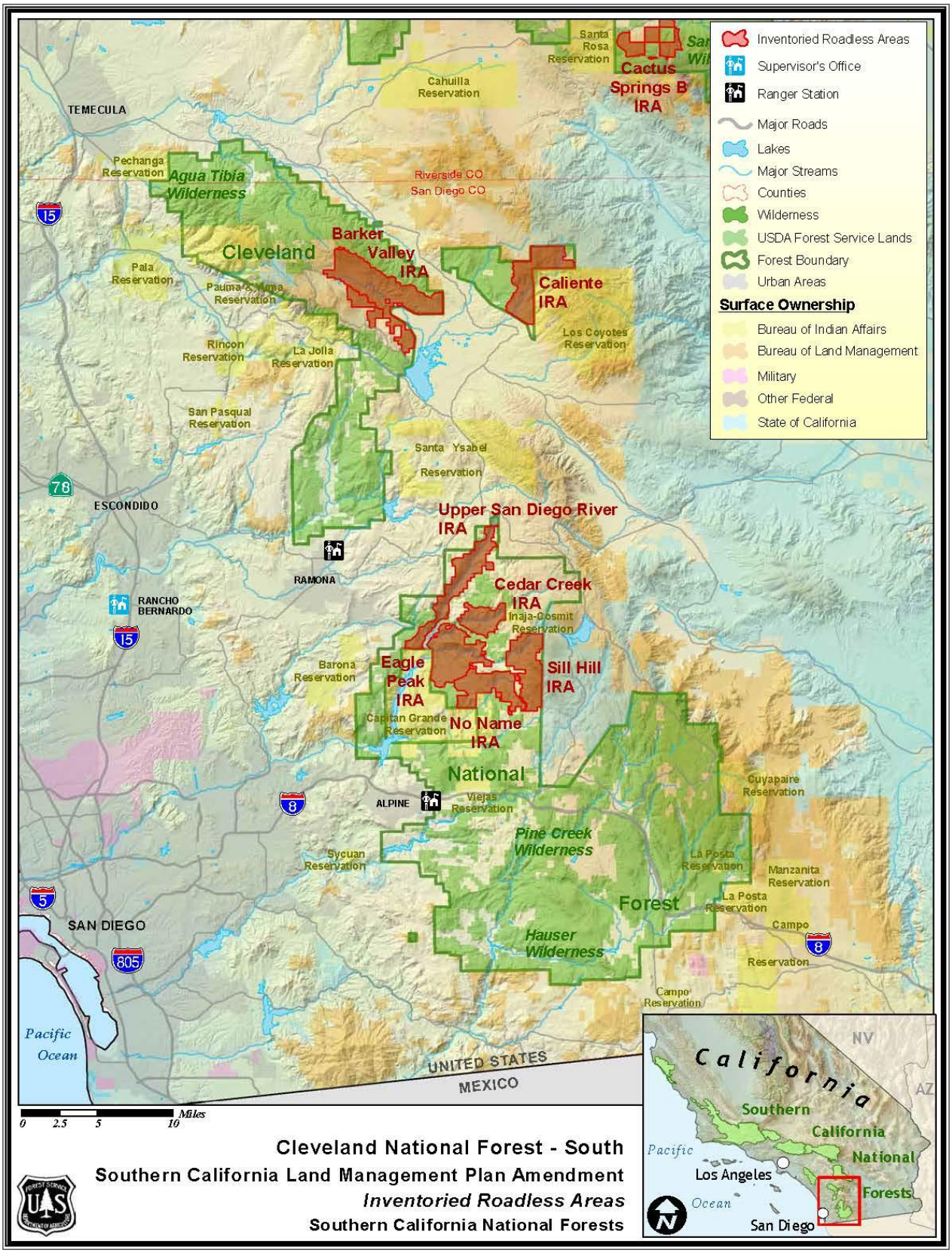
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Caliente IRA
Upper San Diego River IRA
Cedar Creek IRA
Eagle Peak IRA
Sill Hill IRA
No Name IRA
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Pine Creek Wilderness
Hauser Wilderness
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Pacific Ocean
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Riverside CO
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Santa Rosa Reservation
Pechanga Reservation
Pala Reservation
Pauma & Yuma Reservation
Rincon Reservation
La Jolla Reservation
Los Coyotes Reservation
San Pasqual Reservation
Santa Ysabel Reservation
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Comparison of Alternatives

This section provides a summary of the effects of implementing each alternative. The comparison is focused on activities and effects where different levels of effects or outputs can be distinguished quantitatively or qualitatively among alternatives.

The planning area includes all the NFS lands within the settlement agreement IRAs (614,130 acres), and adjacent NFS lands that were included in RW allocations (8,898 acres). The total area considered is 623,028 acres.

The alternatives differ in the amount of area allocated between BCNM and RW. As shown in **Figure 1** and summarized in **Table 4**, the planning area is mainly zoned in BC, BCMUR, and BCNM under the current LMP (Alternative 1 – No Action). Under Alternative 2, the primary change is a large increase in BCNM and a smaller increase in RW. Alternative 2a increases the acreage of RW relative to Alternative 2. Alternative 3 allocates the majority of the area to RW. The CB and DAI zones both decrease slightly under Alternatives 2, 2a and 3.

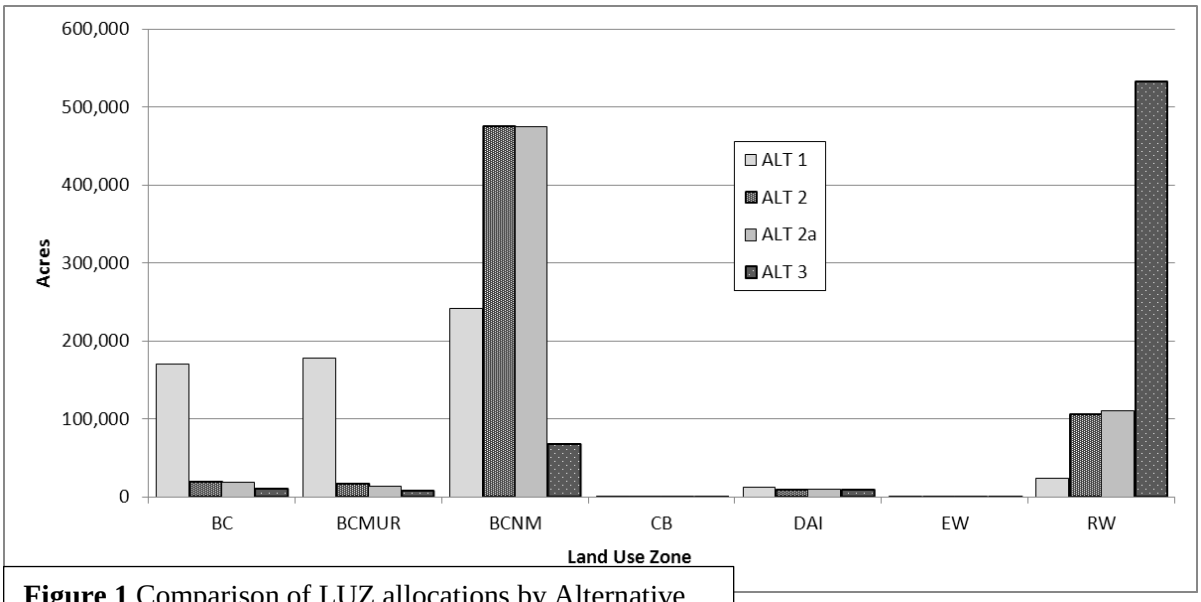

Figure 1 Comparison of LUZ allocations by Alternative

Table 4 displays the acreages of each type of land use zone for each alternative, broken out by National Forest.

Table 4. Summary of LUZ Acreage Allocations for Each Forest by Alternative				
Land Use Zone	**Alternative 1**	**Alternative 2**	**Alternative 2a**	**Alternative 3**
Angeles	**Acres**	**Acres**	**Acres**	**Acres**
Back Country	2,566	1,001	828	314
Back Country Motorized Use Restricted	4,132	1,469	707	707
Back Country Non-Motorized	66,393	30,897	30,577	1,033
Critical Biological	326	12	0	0
Developed Area Interface	1,505	476	476	430
Existing Wilderness	8	8	8	8
Recommended Wilderness	0	41,065	42,333	72,437
Cleveland	**Acres**	**Acres**	**Acres**	**Acres**
Back Country	6,262	1,965	1,876	1,752
Back Country Motorized Use Restricted	6,321	4,124	2,919	2,885
Back Country Non-Motorized	68,308	34,974	34,732	6,118
Critical Biological	507	507	0	0
Developed Area Interface	3,031	1,325	1,293	1,288
Existing Wilderness	0	0	0	0
Recommended Wilderness	0	41,535	43,609	72,387
Los Padres	**Acres**	**Acres**	**Acres**	**Acres**
Back Country	154,641	15,936	15,943	8,152
Back Country Motorized Use Restricted	164,697	10,112	10,112	3,399
Back Country Non-Motorized	86,521	379,810	379,803	59,727
Critical Biological	395	395	395	395
Developed Area Interface	7,032	7,032	7,032	7,032
Existing Wilderness	936	936	936	936
Recommended Wilderness	5,306	5,306	5,306	339,886
San Bernardino	**Acres**	**Acres**	**Acres**	**Acres**
Back Country	6,882	394	394	377
Back Country Motorized Use Restricted	3,018	816	173	191
Back Country Non-Motorized	20,332	29,692	29,692	155
Critical Biological	0	0	0	0
Developed Area Interface	1,440	773	773	773
Existing Wilderness	11	11	11	11
Recommended Wilderness	18,218	18,216	18,859	48,394

CONSULTATIONS AND CONFERENCES TO DATE

The Endangered Species Act (ESA) requires that federal agencies evaluate effects to federally-listed T/E species and CH in consultation with the FWS when proposing federal actions. There are several programmatic and project-specific consultations that have included two of the four T/E plants evaluated in this Biological Assessment (BA).

Programmatic Consultation on LMP in 2000/2001

In 2000, the four southern California National Forests prepared a Programmatic BA for the existing LMPs at the time (USDA Forest Service 2000). The US Fish and Wildlife Service (FWS) issued a Biological Opinion (BO)(1-6-00-F-773.2) in 2001 (USFWS 2001).

Programmatic Consultation on LMP in 2005

In 2005, the four southern California National Forests initiated consultation on the updated LMP (Biological Assessment for the Revised Land Management Plans, dated March 18, 2005) (USDA Forest Service 2005). A BO was issued Sept. 15, 2005 (1-6-05-F733.9 – Biological and Conference Opinions on the Revised Land and Resource Management Plans for the Four Southern California National Forests, California) (USFWS 2005). This consultation did not cover site-specific ongoing effects from National Forest management activities. As such, the southern California National Forests have scheduled preparation of Biological Assessments for consultations to address ongoing effects. Those consultations are discussed below. Consultation was re-initiated August 5, 2008 for Critical Habitat and new species designated after the 2006 ROD for the LMP.

LMP Ongoing Management Activities Consultations 2008 to present

The purpose of the Programmatic On-going Activities Biological Assessments was to facilitate consultation with the U.S. Fish and Wildlife Service (FWS) in response to the court's order in CBD v. US Fish and Wildlife Service, No. 08-cv-1278 (E.D. Cal. 2008). In that order, the court concluded the FWS did not act in accordance with law when it failed to include incidental take statements in the programmatic biological opinion it had prepared for the revised Land Management Plans (LMP) for the four southern California national forests. In order to aid the FWS in its analysis, several programmatic BAs were prepared for ongoing Forest Service management activities implementing the revised forest plans that are believed to be affecting the federally listed species. The Forests were given until December 31, 2012 to complete these BAs. The FWS was given until May 13, 2013 to complete the Biological Opinions; this deadline was extended until September 30, 2013. BOs have been issued for the CNF and SBNF (except Mountaintop Plants) and are pending for the ANF and LPNF at the time of this BA report.

Project-Specific Consultations

In most cases, Formal or Informal Consultations have occurred on all site specific projects that occurred in areas where T/E plants and/or CH occur on the four Forests and there are possible effects from the proposed action on listed species or CH. These consultations are the proposed implementation of the management activities that are allowed within the LMPs, such as hazardous fuels reduction projects, special uses administration and permitting, restoration projects, mining, grazing, and a multitude of other actions. These separate project consultations and assessment can be obtained from each national forest.

Bi-annual Species List Review Requests 2013

The four southern Forests request bi-annual species list review from the FWS. Response from FWS includes any changes to species occurrences on forests or districts.

BASELINE CONDITIONS AND POTENTIAL EFFECTS

Occurrences of T/E Species and Critical Habitat

All T/E plant species and Critical Habitat in **Table 5** were considered in this evaluation**.** Most of the IRAs have not been completely surveyed for botanical resources. It is possible that undetected occurrences of T/E plants occur in the IRAs, especially for those species shown as having a potential to occur on one of the National Forests in **Table 5.** Out of thirty federally-listed plants that occur or have the potential to occur on southern California National Forests, only four species, *Poa atropurpurea, Eryngium aristulatum* var. *parishii, Chlorogalum purpureum* var. *reductum and Eremalche parryi* subsp. *kernensis* are known to occur or have designated Critical Habitat in the IRAs. Detailed species accounts for these four species are attached as Appendix B in this document.

There is no proposed Critical Habitat in the affected IRAs, and no plants proposed for listing under the ESA occur in or near the IRAs.

Table 5. T/E Species and CH by National Forest								
Scientific Name	**Common Name**	**Status**	**Location**				**Critical Habitat**	**Occurrence in IRAs**
			ANF	**CNF**	**LPNF**	**SBNF**		
Acanthomintha ilicifolia	San Diego thornmint	T		K			CNF	N
Acanthoscyphus parishii var. *goodmaniana*	Cushenberry oxytheca	E				K	SBNF	N
Allium munzii	Munz's onion	E		K			CNF (+Proposed CH)	N
Arenaria paludicola	marsh sandwort	E				P	Not on NFS	N
Astragalus albens	Cushenbury milkvetch	E				K	SBNF	N
Astragalus brauntonii	Braunton's milkvetch	E	K	K		P	Designated	N
Astragalus lentiginosus var. *coachellae*	Coachella milkvetch	E				P	Not on NFS	N
Astragalus tricarinatus	triplerib milkvetch	E				K	Not on NFS	N
Baccharis vanessae	Encinitas falsewillow	T		K			None	N
Berberis nevinii	Nevin's barberry	E	K	K		P	CNF	N
Brodiaea filifolia	threadleaf clusterlily	T	K	K		P	CNF; ANF	N
Castilleja cinerea	ashgray paintbrush	T				K	SBNF	N
Ceanothus ophiochilus	Vail Lake Ceanothus;	T		K			CNF	N
Chlorogalum purpureum var. *reductum*	Camatta Canyon amole	T			K		LPNF	N; CH
Cirsium fontinale var. *obispoense*	Chorro Creek bog thistle	E			P		None	N
Dodecahema leptoceras	slender-horned spineflower	E	K	K		K	None	N
Dudleya cymosa ssp. *ovatifolia*	canyon liveforever	T		K			None	N
Eremalche parryi ssp. *kernensis*	Kern mallow	E			K		None	K
Eremogone ursina (formerly Arenaria)	Bear Valley sandwort	T				K	SBNF	N
Eriastrum densifolium ssp. *sanctorum*	Santa Ana woollystar	E				P	None	N
Erigeron parishii	Parish's fleabane	T				K	SBNF	N
Eriogonum kennedyi var. *austromontanum*	southern mountain buckwheat	T			K	K	SBNF	N

Table 5. T/E Species and CH by National Forest								
Scientific Name	**Common Name**	**Status**	**Location**				**Critical Habitat**	**Occurrence in IRAs**
			ANF	**CNF**	**LPNF**	**SBNF**		
Eriogonum ovalifolium ssp. *vineum*	Cushenbury buckwheat	E				K	SBNF	N
Eryngium aristulatum var. *parishii*	San Diego button-celery	E		K			None	K
Nasturtium gambelii (formerly Rorippa)	Gambel's water cress	E				P	None	N
Physaria kingii ssp. *bernardina*	San Bernardino Mountains bladderpod	E				K	SBNF	N
Poa atropurpurea	San Bernardino bluegrass	E		K		K	CNF, SBNF	K, CH
Sidalcea pedata	bird-footed checkerbloom	E				K	None	N
Taraxacum californicum	California dandelion	E				K	SBNF	N
Thelypodium stenopetalum	Slender petal thelypody	E				K	None	N

Status	Occurrence	Location
E=Endangered T=Threatened	K=Known to occur on USFS lands P=Potential to occur on USFS lands N=Not expected to occur due to lack of suitable habitat conditions (e.g., soil types, etc.), distance from known occurrences, or lack of detections during surveys. CH=designated Critical Habitat occurs	ANF=Angeles National Forest CNF=Cleveland National Forest LPNF=Los Padres National Forest SBNF=San Bernardino National Forest

Potential Effects to T/E Species and Critical Habitat

Poa atropurpurea (San Bernardino bluegrass)

This species was federally-listed as Endangered in 1998 (63 Federal Register 49006-49022). Critical Habitat was designated in 2008 (73 Federal Register 47706 47767). A Recovery Plan has not been finalized. *Poa atropurpurea* is restricted to the San Bernardino Mountains in San Bernardino County and in the Laguna and Palomar Mountains in San Diego County. Across its range, of the 19 meadow areas historically and or currently occupied, 10 are known to be currently occupied (USFWS 2008a), including occurrences on the CNF and SBNF. There is designated Critical Habitat on the CNF and SBNF.

Poa atropurpurea is a monocotyledon in the grass family (Poaceae). It is a dioecious rhizomatous perennial grass that flowers between April–June. *Poa atropurpurea* occurs in montane meadows and seeps at elevations of 4,400–8,000 feet (1,360–2,455 m).

The species is usually found on the edges of wet meadows in open pine forests and grassy slopes on loamy alluvial to sandy loam soils. *Poa atropurpurea* tends to occupy somewhat open areas on clay soils with less competition from more mesic species, such as *Poa pratensis, Carex* spp., and *Juncus* spp. These areas are often adjacent to wetter *Carex*/forb vegetation series and *Artemisia tridentata* or *Pinus jeffreyi*. Within meadows, *Poa atropurpurea* may prefer small rocky microhabitats.

There are 2.63 acres of *Poa atropurpurea* occupied habitat in the Barker Valley IRA on the CNF (**Appendix A-Map Packet**; and **Table 6**).

There are 160 acres of *Poa atropurpurea* Critical Habitat in the Barker Valley IRA (**Table 6**).

The Primary Constituent Elements (PCEs) for *Poa atropurpurea* are:

1) wet meadows subject to flooding during wet years in the San Bernardino Mountains in San Bernardino County at elevations of 6,700-8,10 feet, and in the Laguna and Palomar Mountains of San Diego County at elevations of 6,000-7,500 feet that provide space for individual and population growth, reproduction and dispersal, and;
2) well-drained loamy alluvial to sandy loam soils occurring in the wet meadow system with a 0-16 percent slope, to provide water, air, minerals, and other nutritional or physiological requirements to the species.

Table 6. Acres of Poa atropurpurea Habitat in the Barker Valley IRA

Land Use Zone	Alternative 1 (No Action)		Alternative 2 (Proposed Action)		Alternative 2a (Preferred Alternative)		Alternative 3 (RW Emphasis)	
	Occupied Habitat	Critical Habitat	Occupied Habitat	Critical Habitat	Occupied Habitat	Critical Habitat	Occupied Habitat	Critical Habitat
BCMUR	2.63	145	0	16	0	16	0	16
RW	0	0	2.63	0	2.63	0	2.63	0
BCNM	0	15	0	144	0	144	0	144
Total	**2.63**	**160**	**2.63**	**160**	**2.63**	**160**	**2.63**	**160**

In Alternative 1, 2.63 acres of occupied habitat would remain the same (BCMUR). Under Alternatives 2, 2a and 3, the occupied habitat would be managed as RW with continued road access subject to the terms of the permit (**Table 6).** Overall, management under Alternatives 2, 2a and 3 is expected to be wholly beneficial for this species.

In Alternative 1, the 145 acres of designated Critical Habitat in BCMUR and 15 acres in BCNM would remain the same. In Alternatives 2, 2a and 3, only 16 acres would remain in BCMUR and the remaining144 acres would change to BCNM (**Table 6).** If effects are occurring to *Poa atropurpurea* plants and/or the PCEs of the designated Critical Habitat, they may be reduced under Alternatives 2, 2a and 3 because of the reduction of suitable uses. Management under Alternatives 2, 2a and 3 is expected to be wholly beneficial for *Poa atropurpurea* Critical Habitat.

A recovery plan and conservation strategy for *Poa atropurpurea* is not yet available. Any activities proposed under a future recovery plan would be allowed under all alternatives.

Special management considerations for protection of the physical and biological features related to geographically specific threats are defined within each Critical Habitat management unit. For the Mendenhall Unit, Special Management Considerations-Mendenhall Unit 13 (within Barker IRA) may be required to: restore, protect and maintain essential features due to threats from grazing and invasive, nonnative plant species. The special management considerations could be implemented under all alternatives.

Eryngium aristulatum var. parishii (San Diego button celery)

Eryngium *aristulatum* var. *parishii* was listed as Endangered in 1993 (58 FR 41384) and is included in the Recovery Plan for Vernal Pool Plants of Southern California issued in September 1998. Critical habitat has not been designated. It was listed as endangered by the State of California in 1979 (USFWS 2010).

According to the USFWS 2010 Five year review, much progress has been made to conserve and acquire habitat under the Western Riverside County MSHCP, the San Diego MSCP, and efforts to manage habitat at the MCAS Miramar and MCB Camp Pendleton INRMS have reduced or ameliorated may of the original threats. Restoration and conservation of vernal pool habitat has also been created through policy and partnerships at MCB Camp Pendleton and MCAS Miramar. The USFWS 1998 recovery criteria for vernal pool ecosystems which include *Eryngium aristulatum var. parishii* are not threat based but instead address ecosystem function and integrity which include:

(1) Existing vernal pools and their associated watersheds… should be secured from further loss and degradation. Habitat functions and species viability… must be ensured… Maintaining habitat function and species viability (as determined by prescribed research tasks) was considered an important part of these criteria;
(2) The existing vernal pools and their associated watershed contained within the complexes… are secured in a configuration that maintains habitat function and species viability (as determined by recommended research);

(3) Secured vernal pools are enhanced or restored such that population levels of existing species are stabilized or increased; and
(4) Population trends must be shown to be stable or increasing for a minimum of 10 consecutive years prior to consideration for reclassification. Monitoring should continue for a period for at least 10 years following reclassification to ensure population stability.

As such, USFWS found *Eryngium aristulatum* var. *parishii* still met the definition of endangered and did not recommend a status change.

Eryngium artistulatum var. *parishii* is a spreading plant reaching 16 inches in height in the carrot/parsley (Apiaceae) family. It can occur as a bi-annual herb or a longer lived perennial due to its storage tap-root (Preston, Park and Constance 2012). It is known as a vernal pool obligate occurring on clay soils and relies on ephemerally wet conditions for reproduction. While it is often associated with other federally listed vernal pool flora (*Orcuttia californica, Pogogyne abramsii, Pogogyne nudiuscula, Navarretia fossalis), Eryngium aristulatum* var. *parishii* may be more able to tolerate habitat along the periphery of a vernal pool than most obligate vernal pool species USFSW 2010). When dry, vernal pools can appear as xeric playas or otherwise open or degraded landscapes (USFWS 2010). *Eryngium aristulatum* var. *parishii* is also known to occur in marshes (Preson, Park and Constance 2012).

Eryngium aristulatum var. *parishii* flowers from April-June, and is an outcrosser that reproduces exclusively from seeds (USFWS 2010). Assumed to be insect pollinated like *Eryngium aristulatum* var. *aristulatum,* conservation of all life stages of pollinators in adjacent habitat may be needed for pollination (Thorp 2007 in USFWS 2010).

Eryngium aristulatum var. *parishii* is one of three varieties of *Eryngium aristulatum.* Some former populations identified as *E. aristulatum* var. *parishii* were described in 1999 as a new species now known as *Eryngium pendletonensis* (USFWS 2010). The USFWS five year review for *Eryngium aristulatum* var. *parishii* states the plant is known to occur within 14 geographic areas in Riverside and San Diego Counties. Four sites occur on the Santa Rosa Plateau, the remainder of occupied range occurs in ten regional locations in San Diego County including MCB Camp Pendleton, Carlsbad, San Marcos, Ramona, Del Mar Mesa, Carmel Mountain, Mira Mesa, MCAS Miramar, Otay Lakes and Otay Mesa. A few occurrences are also known from northern Baja California, Mexico.

A new occurrence located at Kessler Flat on the Cleveland National Forest was mapped and vouchered by Jerilyn Hirshberg 01August 2009 (Consortium of California Herbaria, specimen #SD217540 available at http://ucjeps.berkeley.edu/cgi-bin/new_detail.pl?SD217540&YF=0)

This occurrence is also documented as Element occurrence # 108 in the California Natural Diversity Database where the ecological information states: "Granitic. In bed of small dry pool/depression in grassland on Mesa top, just above springy area at head of seasonal tributary to Cedar Creek. On bare soil at lowest part of depression with *Nassela cernua, Sisyrinchium bellum*, etc." General data states: "Only source of information for this site is a 2009 Hirshberg collection annotated to *E. aristulatum* var. *parishii* by J. Rebman; Rebman notes that this site is "out of the range and elevation but [specimen] has acuminate fruit scales and entire branches".

This 2009 occurrence was not included in the 2010 USFWS Five Year Review nor was it known to the Cleveland National Forest until notification on 30 July 2013. Kirsten Winter, Cleveland National Forest biologist contacted Jerilyn Hirshberg 31 July 2013 and acquired directions to the site. Hirshberg reported locating a population of 50-75 plants on 1 August 2009 after the Witch Fire. She stated plants only emerge in wet years and she observed no plants in 2013 (Hirshberg, Winter pers. comm. 2013). Winter visited the site on 01 August 2013 where she confirmed approximately a 1/10 acre of habitat was present but as previously noted by Hirshberg no plants were observed. Winter assessed habitat conditions and saw no evidence of recent grazing or issues with off highway vehicle use (Winter, pers. comm. 2013).

Winter mapped the location within the vernal pool feature on the USFS Santa Ysabel quadrangle at T13S, R3E, SE ¼ of section 20 at the edge of the section line between sections 20 and 29. It is approximately 1/10 mile west of Eagle Peak Road on the south side. We are confident the Kessler Flat location is correct, as the Consortium of California Herbaria and CNDDB location was mapped from mile markers along Eagle Peak Road that were not accurately placed and cannot be located on a map without driving the road.

In alternative 1, the 1/10 acre of occupied habitat of *Eryngium aristulatum* var. *parishii* is located within the road buffer of Eagle Peak Road and is zoned as Back Country (BC). It is located adjacent to but is not within an IRA or undeveloped area being analyzed in this decision and is not subject to Roadless Rule regulations. Under this alternative the 1/10 acre of occupied habitat would be retained as BC, there would be no changes to activities or land use zones in the occupied habitat. The suitable uses (activities) shown in **Table 3** in the Back Country column would be retained. Roadless Rule regulations shown in the IRA/RACR column would not apply.

In Alternatives 2, 2a and 3 the 1/10 acre of occupied habitat of *Eryngium aristulatum* var. *parishii* is zoned as RW within the Cedar Creek, Eagle Peak, No Name, Sill Hill, Upper San Diego River Adjacent Area. (**Appendix A-Map Packet**; and **Table 7**). This is a situation where the Forest included the RW allocation to "capable and available areas adjacent to the settlement IRAs" when inclusion created a more logical wilderness area boundary. The location of the *Eryngium* within this Area is adjacent to but not within an IRA. As such, the population would not be subject to management under the IRA Roadless Rule, it would be managed as Recommended Wilderness. A comparison of the 29 suitable uses (activities) allowed under IRA/RACR verses Recommended Wilderness is shown in **Table 3**. Of the 29 activities, 23 would be more restrictive under Recommended Wilderness than under IRA/RACR management. Overall, management under Alternatives 2, 2a and 3 would be wholly beneficial for this species.

Recovery plan activities would be allowed under all alternatives.

Table 7. Acres of Eryngium aristulatum var. parishii Habitat in the Cedar Creek, Eagle Peak, No Name, Sill Hill, Upper San Diego River Adjacent Area								
Land Use Zone	**Alternative 1 (No Action)**		**Alternative 2 (Proposed Action)**		**Alternative 2a (Preferred Alt.)**		**Alternative 3 (RW Emphasis)**	
	Occupied Habitat	**Critical Habitat**	**Occupied Habitat**	**Critical Habitat**	**Occupied Habitat**	**Critical Habitat**	**Occupied Habitat**	**Critical Habitat**
BC	1/10 acre	0	0	0	0	0	0	0
RW	0	0	1/10 acre	0	1/10 acre	0	1/10 acre	0
Total	**1/10 acre**	**0**	**1/10 acre**	**0**	**1/10 acre**	**0**	**1/10 acre**	**0**

Chlorogalum purpureum var. reductum (Camatta Canyon amole)

This species was listed as Threatened in 2000 (65 FR 14878-14888, 2000) and Critical Habitat was designated on October 24, 2002 (67FR 65413). A Recovery Plan for *Chlorogalum purpureum* var. *reductum* is not yet available. This species is a narrowly-distributed endemic that occurs on the northeast side of the La Panza Range in San Luis Obispo County. It is known from one population within a small geographic area. Plants occur in two discrete locations. The larger site is adjacent to State Highway 58, a two-lane road. A smaller site occurs approximately 3 miles (4.8 kilometers) to the south. Most of the population is believed to occur on the LPNF; however, lack of surveys on non-NFS lands make it impossible to quantify. The LPNF occurrence is known to extend onto the adjacent right-of-way of State Highway 58 managed by the California Department of Transportation and onto nearby private properties.

Chlorogalum purpureum var. *reductum* is a monocot in the century plant family (Agavaceae) and is a perennial lily that is smaller in size than its look-a-like *Chlorogalum purpureum* var. *purpureum* (purple amole). Both are federally Threatened species. *Chlorogalum purpureum var. reductum* is much more restricted and is estimated to only occupy 127 acres (USFWS 2008c), 41 which occur on the LPNF (USDA Forest Service 2005).

Chlorogalum purpureum var. *reductum* occurs in grassland, oak woodland, and oak savannah at elevations of 1,000-2,050 feet (305-625 meters) in the South Coast Ranges. Like other members of the lily family, *Chlorogalum purpureum* var. *reductum* probably develops root-hyphae relationships with a fungus. These mycorrhizal relationships can aid in nutrient and water uptake by the host plant and can alter growth and competitive interactions between species. At both known locations of *Chlorogalum purpureum* var. *reductum*, the plants grow in variously sized patches and are not uniformly distributed throughout the habitat, which is described as sparsely vegetated annual grasslands surrounded by blue oak (*Quercus douglasii*) woodland and gray/foothill pines (*Pinus sabiniana*).

Chlorogalum purpureum var. *reductum* grows on well-drained red clay soils with substantial amounts of pebbles and gravels and a high (8:1) calcium to magnesium ratio. Despite reports to the contrary, the substrate in this area is not serpentine. The taxon appears to be restricted to areas with rocky, nutrient-poor soils that tend to prevent herbivory by pocket gophers. In areas with better soils, nonnative annuals (*e.g.*, *Bromus madritensis* ssp. *rubens*, *Erodium*

spp., *Schismus barbatus, Avena barbata*) appear to be outcompeting *Chlorogalum purpureum* var. *reductum* for space, light, nutrients, and water. This species may be associated with cryptobiotic [*i.e.*, cryptogamic] crusts (USFWS 2008c).

There are no known occurrences of *C. p.* var. *reductum* within any of the affected IRAs. However, there is an occurrence approximately 800 feet east of the Black Mountain IRA boundary.

There are 4,378 acres of Critical Habitat for *C. purpureum* var. *reductum* with 1,087 acres (~25%) occurring on NFS lands (Forest Service GIS). There are 82 acres of *Chlorogalum purpureum var. reductum* Critical Habitat in the Black Mountain IRA. There are two private inholding areas of Critical Habitat within the LPNF boundary.

The primary constituent elements (PCEs) of Critical Habitat for *Chlorogalum purpureum var. reductum* consist of:

- well-drained , red clay soils with a large component of gravel and pebbles on the upper soil surface; and
- plant communities in functioning ecosystems that support associated plant and animal species (*i.e.*, pollinators, predator-prey species, etc.), including grassland (most similar to the California annual grassland series in Sawyer and Keeler-Wolf (1995) or the pine bluegrass grassland, non-native grassland and wildflower field descriptions in Holland (1986), blue oak woodland or oak savannah (Holland 1986), oak woodland, and open areas within shrubland communities (most similar to the Chamise series in Sawyer and Keeler-Wolf [1995]), although present cover of chamise at known areas of *C. p.* var. *reductum* is unknown). Within these vegetation communities *C. p. var. reductum* appears where there is little cover of other species which compete for resources available for growth.

At least one of the primary constituent elements must be present in order for an area to be considered Critical Habitat.

Because this species is not known or expected to occur in any of the affected IRAs, no effects to occurrences would be expected from any of the four alternatives.

The proposed alternatives would result in changes within designated Critical Habitat for this species. There are 82 acres of Critical Habitat within the 16,814 acre Black Mountain IRA. **Table 8** displays the changes in LUZ to acres of Critical Habitat in the Black Mountain IRA for each alternative.

***Table 8. Acres of Chlorogalum purpureum* var. *reductum* Habitat in the Black Mountain IRA**								
Land Use Zone	**Alternative 1 (No Action)**		**Alternative 2 (Proposed Action)**		**Alternative 2a (Preferred Alt.)**		**Alternative 3 (RW Emphasis)**	
	Occupied Habitat	**Critical Habitat**	**Occupied Habitat**	**Critical Habitat**	**Occupied Habitat**	**Critical Habitat**	**Occupied Habitat**	**Critical Habitat**
BC	0	67	0	1	0	1	0	1
BCNM	0	15	0	81	0	81	0	0
RW	0	0	0	0	0	0	0	81
Total	**0**	**82**	**0**	**82**	**0**	**82**	**0**	**82**

Under Alternative 1, there would be no changes to activities and LUZs (67 acres BC, 15 acres BCNM) in the Critical Habitat. The suitable uses (activities) shown in **Table 3** in the Back Country and Back Country Non-Motorized columns would be retained. Under Alternatives 2 and 2a, only 1 acre would remain in BC and the remainder (81 acres) would be zoned BCNM. Under Alternative 3, the BCNM acres would become RW.

If effects are occurring to the PCEs, Alternatives 2 and 2a would be wholly beneficial as acres shift from BC to BCNM because of a reduction of suitable uses within the Critical Habitat. Alternative 3 may further reduce effects because a greater number of suitable uses would be precluded under RW. Alternative 3 would also be wholly beneficial.

Special management considerations for protection of the physical and biological features related to geographically specific threats are defined within each Critical Habitat management units, such as protect from frequent fires and non-native species. These special management considerations could be implemented under all alternatives. In Alternatives 2, 2a and 3, managing the area as BCNM and RW respectively, may promote use of four of the seven recommended special management considerations to maintain primary constituent elements (1, 2, 3 and 6 above).

Any activities proposed under future recovery plans would be allowed under all alternatives.

Eremalche parryi subsp. kernensis (Kern mallow)

Eremalche kernensis is the name retained by USFWS for the plant now referred to as *Eremalche parryi* subsp. *kernensis* (C.B. Wolf) D.M. Bates (Baldwin, B.G., D.H. Goldman, D.J. Keil, R. Patterson, T. J. Rosatti, and D.H. Wilken. 2012). The discussion below utilizes the latest nomenclature.

Eremalche parryi subsp. *kernensis* was listed as Endangered in 1990 (55 FR 29361) and is included in the Recovery Plan for Upland Species of the San Joaquin Valley; California in September 1998 (USFWS 1998). No recovery actions were recommended for USFS lands as presence was unknown at the time. Critical habitat has not been designated.

The USFWS Five Year Review for *Eremalche parryi* subsp. *kernensis* completed 08 August 2013 utilized the best available scientific and commercial data on the species and focused on new information since listing. Location data utilized to update the spatial distribution and abundance section in the Five Year Review were compiled in two appendices. Appendix A which utilized information from professional botanists, published literature, unpublished reports and the California Natural Diversity Database states that approximately 209 occurrences are presumed extant in five counties. However many of these records remain unchecked, require updating or have not been field checked to determine if *E. parryi* subsp. *kernensis* is still present (USFWS 2013.) Appendix B was compiled using information from herbaria at academic institutions throughout California, and the Consortium of California Herbaria. It contains 182 records, some that have been verified within the last ten years and others that need verification to determine if the plant remains extant at those locations.

Of the 209 occurrences, thirty five per cent are located on private land or land where ownership status was not known; two per cent are protected on state-owned preserves (USDA FS 2013.) Fifty nine per cent of the occurrences are considered protected from direct effects on federal lands but all populations are subject to threats such as grazing, non-native plant competition, off-highway vehicle use, and mineral exploration and extraction. It is important to note however that grazing is now utilized as a habitat management tool throughout the range of *E. parryi* subsp. *kernensis* on federal lands to eliminate competition from both non-native and native competitors. Livestock grazing occurs on the Carrizo Plain National Monument, the LPNF, and is being considered for the Bitter Creek National Wildlife Refuge (CNDDB 2013 and USFWS 2013). Additional threats since listing include nitrogen deposition, high speed rail, climate change, loss of pollinators and solar development.

The USFWS concluded that the plant still meets the definition of endangered and recommended no status change at this time (USFWS 2013). Recommendations for actions over the next five years include:

1) More robust genetic testing should be conducted to determine if *Eremalche parryi* subsp. *kernensis* is a separate lineage from *E. parryi*,

2) Existing records from all sources that have not been confirmed within the last 10 years should be verified and locations field checked to determine if *Eremalche parryi* subsp. *kernensis*, or its habitat, is still present. Field surveys should be timed for favorable conditions, such as in the first wet year following drought, if possible,

3) Recovery actions specified in the Recovery Plan should be updated to include populations outside of the Lokern area, and the term "precipitation cycle" should be clarified with regard to the ephemeral nature of *Eremalche parryi* subsp. *kernensis* populations.

4) Known populations of *Eremalche parryi* subsp. *kernensis* should be monitored during multiple precipitation/drought cycles to gain a better understanding of the ecology of the species and how it interacts with grazing and with other species (both native and non-native.

Eremalche parishii subsp. kernensis is an annual herb in the mallow family (Malvaceae) with flower color ranging from white to more or less purple. It is the only taxon in the *Eremalche* genus that exhibits gynodioecy (plants with either perfect flowers or pistillate flowers). Populations have been found to be comprised of plants that exhibit perfect flowers and plants with pistillate flowers. Occupied habitat includes arid lands within the southern San Joaquin Valley, Carrizo Plain, Cuyama Valley and the Transverse Ranges.

Elevational gradients and soil conditions result in habitat with varying vegetation types and associated species (USFWS 2013). At elevations up to 2,000 feet (3,000 feet on Carrizo Plain) plants are found on soils described as alkaline, light and non-alkaline, alluvial, shale, clay-like, hard, gravelly slopes, loose, whitish-gray, loamy and dry sandy loam that support grassland and saltbush scrub habitat. In this habitat, plant grow beneath *Atriplex spinifera* and *Atriplex polycarpa*, and are associated with *Bromus madritensis* subsp. *rubens, Erodium cicutarium, Lasthenia minor*, *Layia pentachaeta* subsp. *albida* and *Schismis barbatus*. Between 2000-3000 feet, plants are associated with *Ephedra californica. Above* 3,000 feet plants occur in gravelly, shale or silty soils within juniper woodland and grow beneath and among *Juniperus californica* (USFWS 2013).

Precipitation greatly affects phenology and reproduction. In wet years following drought, plants germinate and grow quickly the first year then decline in subsequent years as they become crowded out by larger species. In the Lokern area, seed germination typically occurs in January and February. Plants flower in March then begin fruiting within a few days after flowers appear and continue into May depending on moisture availability (USFWS). As soon as fruits mature, seeds are released and are presumed to be dispersed by wind or small mammals. While seed germination may occur the following season, some are retained in the soil seed bank. The length of time that the seed bank remains viable is unknown. The Sawmill-Badlands occurrence was in flower on 04 May (CCH 2013).

Flower color, gender and range provide the basis for identification and taxonomic status of this taxon. There is a long history of classification resulting in the current diagnostic feature for *Eremalche kernensis* being gender. The USFWS uses the name *Eremalche kernensis* while noting that *Eremalche parryi* subsp. *kernensis* is also accepted however "more individuals need to be investigated to evaluate the status of the endangered taxon" according to Andreasen 2012 (in USFWS 2013).

The analysis of E. *parryi subsp. kernensis* for this Biological Assessment was completed utilizing information from the Five Year Review and California Consortium of Herbaria (CCH) records. The USFS mapped one occurrence of *Eremalche parryi* subsp. *kernensis* within the Sawmill-Badlands IRA using geographical coordinates for *Eremalche parryi* subsp. *kernensis and Eremalche parryi* vouchered in the California Consortium of Herbaria in Ventura County. Voucher details are displayed below. Elizabeth Painter and Pam DeVries determined this specimen to be *Eremalche parishii* subsp. *kernensis (*USFWS 2013). It is known as CNDDB EO# 7. The map in Appendix A of this biological assessment displays the location of voucher RSA772449 in Section 36 at the top center of the map.

Voucher information regarding *Eremalche parryi* subsp. *kernensis* in the Sawmill Badlands IRA (California Consortium of Herbaria 2013)	
Specimen number	RSA772449
Determination	Eremalche parryi
Collector, number, date	LeRoy Gross, Pamela Conway, 5441, May 4 2011
County	Ventura
Locality	Transverse Ranges; Mount Pinos region Quatal Canyon, south off Forest Service Road 9N09, east of Highway 33 and the upper Cuyama Valley. Started just off the road near 34.82657N, 119.40509W. Surveyed SSE across large wash to south slope, near 34.820097N, 119.39975W. Collection site near
Elevation	1024-1036 m
Coordinates	34.820 -119.399
Datum	Not recorded
Coordinate source	Not recorded
	Coords. cont.: 9N24W35, 36>; USGS Quad: Cuyama Peak 7.5 quad.; Broad river wash, with upper sandy benches. Dry, sunny Pinyon-Juniper woodland with: Quercus john-tuckeri, Arctostaphylos glauca, Yucca whipplei, Ericameria linearifolia, Artemisia tridentata, Hymenoclea salsola, Purshia tridentata glandulosa, Astragalus lentiginosus nigricalycis, Pholistoma membranaceum, and many annuals. Growing near edges of large junipers, on upper sandy benches. Flower size fits into ssp. kernensis, but did not see many plants, and all that I seen were bisexual flowers. All lavender color. Flowering native ;

The effects analysis for this population within the Sawmill-Badlands IRA is based on presence alone not acreage. The occurrence has not been verified on the ground by a USFS botanist and is based solely on the geographical coordinates from the California Consortium of Herbaria. It is possible that additional populations could occur within the Sawmill Badlands IRA. Other vouchered specimens that occur near the Quatal and Sespe Frasier IRAs have not been confirmed to occur within the IRAs. Therefore the effects analysis for this proposed action includes only the known occurrence within the Sawmill-Badlands IRA.

In Alternative 1, the occurrence of *Eremalche kernensis* subsp. *parryi* is zoned as Back Country (BC) within the Sawmill-Badlands IRA. Under this alternative, land use zoning of the occupied habitat would be retained as BC. There would be no changes to activities or land use zones within the occupied habitat. The suitable uses (activities) shown in **Table 3** in the Back Country column would be retained.

In Alternatives 2 and 2a the occurrence of *Eremalche kernensis* subsp. *parryi* is zoned as Back County Non-Motorized (BCNM) within the Sawmill-Badlands IRA (**Appendix A-Map Packet**;

and **Table 9**). Overall, management under Alternatives 2 and 2a would be wholly beneficial for this species.

In Alternative 3, the occurrence of occupied habitat of *Eremalche kernensis* subsp. *parryi* is zoned as Recommended Wilderness (RW) within the Sawmill-Badlands IRA (**Appendix A-Map Packet**; and **Table 9**). Overall, management under Alternative 3 would be wholly beneficial for this species.

The 2013 USFSW Five Year Review "recommended actions for the next 5 years" and any future implementation of recovery actions would be allowed under all alternatives.

Table 9. Known occurrences of Eremalche parryi* subsp. *kernensis* in the Sawmill-Badlands IRA

Land Use Zone	Alternative 1 (No Action)		Alternative 2 (Proposed Action)		Alternative 2a (Preferred Alt.)		Alternative 3 (RW Emphasis)	
	Occupied Habitat	Critical Habitat	Occupied Habitat	Critical Habitat	Occupied Habitat	Critical Habitat	Occupied Habitat	Critical Habitat
BC	1	0	0	0	0	0	0	0
BCNM	0	0	1	0	1	0	0	0
RW	0	0	0	0	0	0	1	0
Total	1	0	1	0	1	0	1	0

DETERMINATION OF EFFECTS

Table 10 summarizes the effects for T/E species and CH. **Table 11** summarizes the determinations of effects.

Alternative 1 (No Action):

For Alternative 1 (No Action), the determinations of effects for *Chlorogalum purpureum* var. *reductum* and *Poa atropurpurea* would not change from those made in the supporting biological documents for the selected alternative in the 2006 FEIS. The supporting documents in that Project Record are incorporated here by reference. The "determinations of effects" from the 2006 LMP were "***may affect and is likely to adversely affect (LAA)"*** for *Chlorogalum purpureum var. reductum* and *Poa atropurpurea* and ***"may affect and is likely to adversely affect"*** some Critical Habitat for *Chlorogalum purpureum var. reductum*. Consultation was re-initiated in 2008 when Critical Habitat was designated. The determination was ***"may affect and is likely to adversely affect"*** some CH for *Poa atropurpurea.*

Eryngium aristulatum var. parishii and Eremalche parryi subsp. *kernensis* were not known to occur on the southern California National Forests during the 2006 Forest Plan Revision thus were not included in the 2006 FEIS analysis or consultation with USFWS. If the Cleveland and Los Padres National Forests determine there are effects to these species consulation would be initiated.

Alternative 2 (Proposed Action):

It is my determination that implementation of Alternative 2 "***may affect but is not likely to adversely affect (NLAA-BE)"*** occupied or designated Critical Habitat of *Poa atropurpurea,*

occupied habitat of *Eryngium aristulatum* var. *parishii* or *Eremalche parryi* subsp. *kernensis* or designated Critical Habitat of *Chlorogalum purpureum* var. *reductum.* The effects of Alternative 2 would be wholly beneficial to these four plant species. Alternative 2 would have **no effect (NE)** on occupied habitat of *Chlorogalum purpureum* var. *reductum* or any other T/E species in **Tables 5** or **11** since none are known to occur in the IRAs.

Alternative 2a (Preferred Alternative):

It is my determination that implementation of Alternative 2a "***may affect but is not likely to adversely affect (NLAA-BE)"*** occupied or designated Critical Habitat of *Poa atropurpurea,* occupied habitat of *Eryngium aristulatum* var. *parishii* or *Eremalche parryi* subsp. *kernensis* or designated Critical Habitat of *Chlorogalum purpureum* var. *reductum.* The effects of Alternative 2a would be wholly beneficial to these four plant species. Alternative 2a would have ***no effect (NE)*** on occupied habitat of *Chlorogalum purpureum* var. *reductum* or any other T/E species in **Tables 5** or **11** since none are known to occur in the IRAs.

Alternative 3 (Recommended Wilderness Emphasis): It is my determination that implementation of Alternative 3 ***"may affect but is not likely to adversely affect (NLAA-BE)"*** occupied and Critical Habitat of *Poa atropurpurea,* occupied habitat of *Eryngium aristulatum* var. *parishii* or *Eremalche parryi* subsp.*kernensis* or designated Critical Habitat of *Chlorogalum purpureum* var. *reductum.* The effects of Alternative 3 would be wholly beneficial to these four plant species. Alternative 3 would have ***no effect (NE)*** on occupied habitat of *Chlorogalum purpureum* var. *reductum* or any other T/E species in **Tables 5** or **11** since none is known to occur in the IRAs.

Monitoring and Evaluation Alternatives A, B, and C:

It is my determination that changing the monitoring methodology, in itself, is expected to result in ***no effect (NE)*** to T/E plants or their Critical Habitat.

Consultation Requirements

Informal Consultation will be conducted with USFWS due to the ***"may affect, not likely to adversely affect (NLAA)"*** and wholly **beneficial effects (BE)** determinations. Based on the proposed action and analysis of effects, Section 7 Formal Consultation is not required.

Table 10. Summary of Effects to T/E Plant Species and Critical Habitat					
Effect	**Indicator**	**Alternative 1 (No Action)**	**Alternative 2 (Proposed Action)**	**Alternative 2a (Preferred Alternative)**	**Alternative 3 (RW Emphasis)**
Effects To Federally Listed Plant Species (TEPC) (Including Beneficial Effects)	**Occupied Habitat *Poa atropurpurea***				
	Change in occupied *Poa atropurpurea* habitat acres into more restrictive land use zones	No change from existing environment. BCMUR = 2.63 acres of occupied habitat	All occupied habitat (2.63 acres) changes from BCMUR to RW	All occupied habitat (2.63 acres) changes from BCMUR to RW	All occupied habitat (2.63 acres) changes from BCMUR to RW
	Relative effects to *Poa atropurpurea*	No change from existing environment	Less impact than Alternative 1 due to less intensive development and limited motorized access/ mechanized use. Wholly beneficial effects anticipated.	Same as Alt 2 &3	Same as Alt 2 and 2a
	Ability to maintain, enhance or treat *Poa atropurpurea* habitat based on conservation recommendations in the CNF 1991 Species Management Guide	Can maintain, enhance and treat	Can maintain, enhance and treat	Can maintain, enhance and treat	Can maintain, enhance and treat
	***Poa atropurpurea* Recovery Plan actions/activities**	N/A (No Recovery Plan)	N/A (No Recovery Plan)	N/A (No Recovery Plan)	N/A (No Recovery Plan)
	Occupied Habitat *Eryngium aristulatum* var. *parishii*				
	Change in occupied *Eryngium aristulatum* var. *parishii* habitat acres into more restrictive land use zones	No change from existing environment. BC=1/10 acre of occupied habitat	All occupied habitat (1/10 acre) changes from BC to RW	All occupied habitat (1/10 acre) changes from BC to RW	All occupied habitat (1/10 acre) changes from BC to RW
	Relative effects to *Eryngium aristulatum*	No change from existing environment	Less impact than Alternative 1 due to less	Same as Alt 2 &3	Same as Alt 2 and 2a

Table 10. Summary of Effects to T/E Plant Species and Critical Habitat					
Effect	**Indicator**	**Alternative 1 (No Action)**	**Alternative 2 (Proposed Action)**	**Alternative 2a (Preferred Alternative)**	**Alternative 3 (RW Emphasis)**
	var. *parishii*		intensive development and limited motorized access/ mechanized use. Wholly beneficial effects anticipated.		
	Ability to maintain, enhance or treat *Eryngium aristulatum* var. *parishii* habitat	Can maintain, enhance and treat	Can maintain, enhance and treat	Can maintain, enhance and treat	Can maintain, enhance and treat
	***Eryngium aristulatum* var. *parishii* Recovery Plan actions/activities**	Can implement as needed	Can implement as needed	Can implement as needed	Can implement as needed
	Occupied Habitat *Chlorogalum purpureum var. reductum*				
	Change in occupied *Chlorogalum purpureum* var. *reductum* habitat acres into more restrictive land use zones	N/A There is no occupied habitat for this species in any of the alternatives	Same as Alt 1	Same as Alt 1	Same as Alt 1
	Relative effects to *Chlorogalum purpureum* var. *reductum*	N/A There will be no effects to occupied habitat for this species in any of the alternatives	Same as Alt 1	Same as Alt 1	Same as Alt 1
	Ability to maintain, enhance or treat *Chlorogalum purpureum* var. *reductum* habitat	N/A There is no occupied habitat for this species in any of the alternatives.	Same as Alt 1	Same as Alt 1	Same as Alt 1
	Chlorogalum	N/A	Same as Alt 1	Same as Alt 1	Same as Alt 1

Table 10. Summary of Effects to T/E Plant Species and Critical Habitat					
Effect	**Indicator**	**Alternative 1 (No Action)**	**Alternative 2 (Proposed Action)**	**Alternative 2a (Preferred Alternative)**	**Alternative 3 (RW Emphasis)**
	***purpureum* var. *reductum* Recovery Plan actions/activities**	There is no occupied habitat for this species in any of the alternatives.			
	Occupied habitat *Eremalche parryi* subsp. *kernensis*				
	Change in occupied *Eremalche parryi* subsp. *kernensis* habitat acres into more restrictive land use zones	No change from existing environment. Occurrence location is within BC	Occurrence location would change to BCNM	Same as Alt 2	Occurrence location would change to RW
	Relative effects to *Eremalche parryi* subsp. *kernensis*	No change from existing environment	Less impact than Alt 1 due to reduced motorized access. Wholly beneficial effects anticipated	Same as Alt 2	Least impact due to less intensive development and limited motorized/mechanized use. Wholly beneficial effects anticipated.
	Ability to maintain, enhance or treat *Eremalche parryi* subsp. *kernensis* habitat	Can maintain, enhance and treat	Can maintain, enhance and treat	Can maintain, enhance and treat	Can maintain, enhance and treat
	***Eremalche parryi* subsp. *kernensis* Recovery Plan activities**	Can implement as needed	Can implement as needed	Can implement as needed	Can implement as needed
Effects to Critical Habitat (including	**Critical Habitat - *Poa atropurpurea***				
	Location of CH acres by LUZ	No change from existing environment. BCMUR = 145 acres;	Less BCMUR and more BCNM than Alternative 1.	Same as Alt 2 and 3	Same as Alternatives 2 and 2a

Table 10. Summary of Effects to T/E Plant Species and Critical Habitat					
Effect	**Indicator**	**Alternative 1 (No Action)**	**Alternative 2 (Proposed Action)**	**Alternative 2a (Preferred Alternative)**	**Alternative 3 (RW Emphasis)**
beneficial effects)		BCNM = 15 acres	BCMUR = 16 acres, BCNM = 144 acres		
	Primary Constituent Elements	No change from existing environment	No change from existing environment	No change from existing environment	No change from existing environment
	Special Management Considerations	Can restore, protect and maintain essential features	Can restore, protect and maintain essential features	Can restore, protect and maintain essential features	Can restore, protect and maintain essential features
	Critical Habitat - *Chlorogalum purpureum* var. *reductum*				
	Location of CH acres by LUZ	No change from existing environment. BC (67) acres, BCNM (15) acres	Less acres in BC (1), more acres in BCNM (81) than Alternative 1	Same as Alt 2	Same as Alt 2 and 2a for BC; most acres in RW (81)
	Primary Constituent Elements	No change from existing environment	No change from existing environment	No change from existing environment	No change from existing environment
	Special Management Considerations	Can restore, protect and maintain essential features	Can restore, protect and maintain essential features	Can restore, protect and maintain essential features	Can restore, protect and maintain essential features
	Critical Habitat *for Eryngium aristulatum* var. *parishii*				
	Location of CH acres by LUZ	N/A There is no Critical Habitat for this species in any of the alternatives	Same as Alt 1	Same as Alt 1	Same as Alt 1
	Primary Constituent Elements	N/A There is no Critical Habitat for this species in any of the alternatives	Same as Alt 1	Same as Alt 1	Same as Alt 1
	Special Management Considerations	N/A There is no Critical Habitat for this species	Same as Alt 1	Same as Alt 1	Same as Alt 1

Table 10. Summary of Effects to T/E Plant Species and Critical Habitat					
Effect	**Indicator**	**Alternative 1 (No Action)**	**Alternative 2 (Proposed Action)**	**Alternative 2a (Preferred Alternative)**	**Alternative 3 (RW Emphasis)**
		in any of the alternatives			
	Critical Habitat *for Eremalche parryi subsp. kernensis*				
	Location of CH acres by LUZ	N/A There is no Critical Habitat for this species in any of the alternatives	Same as Alt 1	Same as Alt 1	Same as Alt 1
	Primary Constituent Elements	N/A There is no Critical Habitat for this species in any of the alternatives	Same as Alt 1	Same as Alt 1	Same as Alt 1
	Special Management Considerations	N/A There is no Critical Habitat for this species in any of the alternatives	Same as Alt 1	Same as Alt 1	Same as Alt 1

Cumulative Effects

The Action Area for this analysis is the footprint of the IRAs.
The Cumulative Effects discussions below include two definitions:

- Under the NEPA, "cumulative impacts" are those impacts caused by past, present, and future federal, state, and private activities within or to special status species and their habitats.
- Under the ESA, "cumulative effects" only consider future non-federal activities that are reasonably certain to occur.

Future federal activities or activities permitted by federal agencies are not included under ESA "cumulative effects" because any proposed future federal activities or federally permitted activities must undergo Section 7 consultation with the USFWS. Also, the proposed action and alternatives are for changes to land use zones on a programmatic basis and do not include site specific actions which would have direct effects on species or habitats. The effects of the changes in land use zones has been demonstrated to have wholly beneficial effects, thus no negative cumulative effects are expected if alternatives, 1, 2, 2a or 3 are chosen.

Table 11. Summary of Determinations of Effects for T/E Species		
Scientific Name	**Common Name**	**Determination of Effects – Alternatives 2, 2a and 3**
Acanthomintha ilicifolia	San Diego thornmint	NE
Acanthoscyphus parishii var. *goodmaniana*	Cushenberry oxytheca	NE
Allium munzii	Munz's onion	NE
Arenaria paludicola	marsh sandwort	NE
Astragalus albens	Cushenbury milkvetch	NE
Astragalus brauntonii	Braunton's milkvetch	NE
Astragalus lentiginosus var. *coachellae*	Coachella milkvetch	NE
Astragalus tricarinatus	triplerib milkvetch	NE
Baccharis vanessae	Encinitas falsewillow	NE
Berberis nevinii	Nevin's barberry	NE
Brodiaea filifolia	threadleaf clusterlily	NE
Castilleja cinerea	ashgray paintbrush	NE
Ceanothus ophiochilus	Vail Lake Ceanothus	NE
Chlorogalum purpureum var. *reductum*	Camatta Canyon amole	NE for species; NLAA for CH
Cirsium fontinale var. *obispoense*	Chorro Creek bog thistle	NE
Dodecahema leptoceras	slender-horned spineflower	NE
Dudleya cymosa ssp. *ovatifolia*	canyon liveforever	NE
Eremalche parryi ssp. kernensis	Kern mallow	NLAA for species
Eremogone ursina (formerly Arenaria)	Bear Valley sandwort	NE
Eriastrum densifolium ssp. *sanctorum*	Santa Ana woollystar	NE
Erigeron parishii	Parish's fleabane	NE
Eriogonum kennedyi var. *austromontanum*	southern mountain buckwheat	NE
Eriogonum ovalifolium ssp. *vineum*	Cushenbury buckwheat	NE
Eryngium aristulatum var. *parishii*	San Diego button-celery	NLAA for species
Nasturtium gambelii (formerly Rorippa)	Gambel's water cress	NE
Physaria kingii ssp. *bernardina*	San Bernardino Mountains bladderpod	NE
Poa atropurpurea	San Bernardino bluegrass	NLAA for species; NLAA for CH
Sidalcea pedata	bird-footed checkerbloom	NE
Taraxacum californicum	California dandelion	NE
Thelypodium stenopetalum	Slender petal thelypody	NE
NE=No Effect NLAA=Not Likely to Adversely Affect MAA=May Adversely Affect		

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APPENDIX A
MAPS OF OCCUPIED AND CRITICAL HABITAT WITHIN IRAS

There are 5 maps.

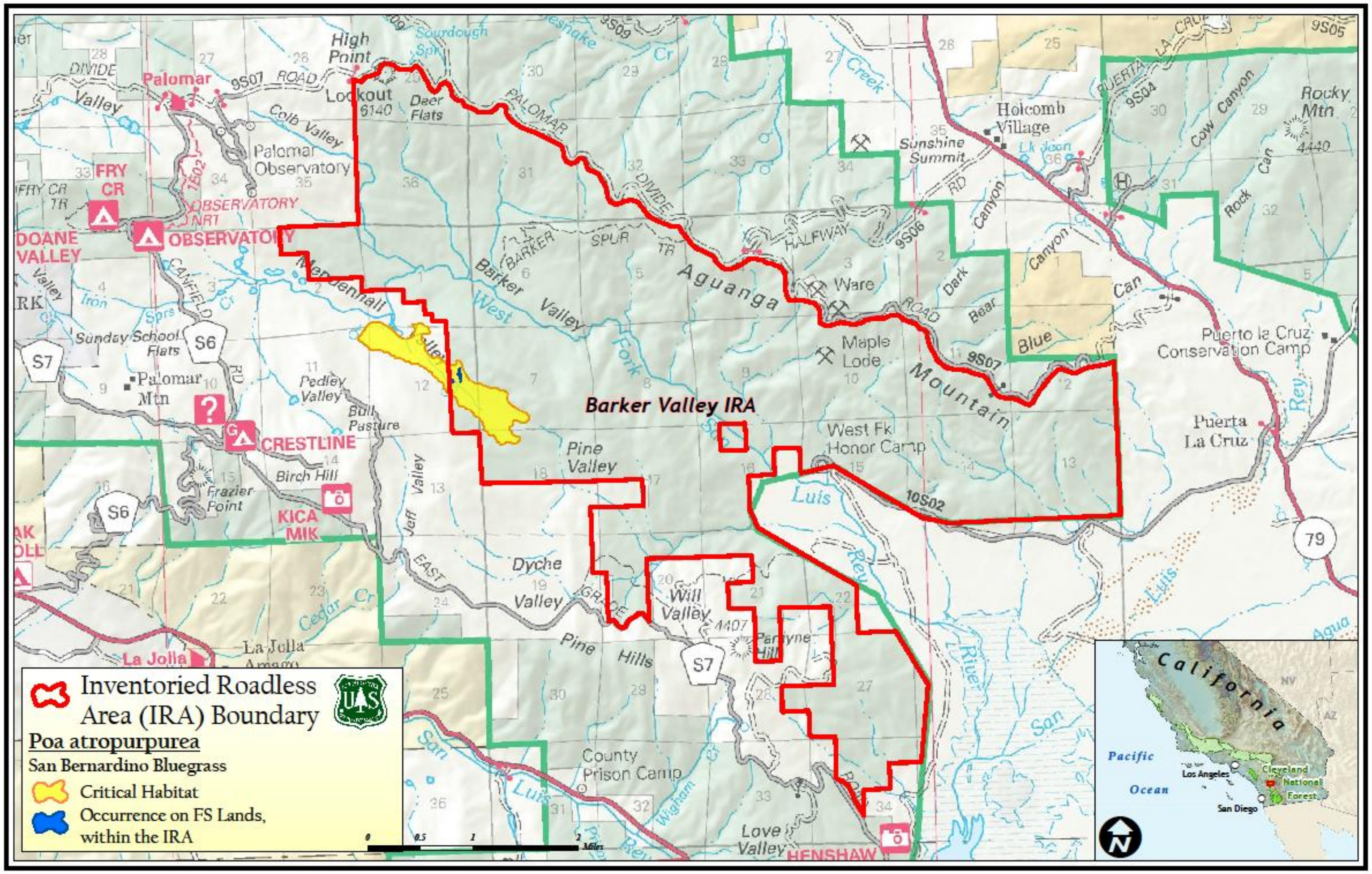
***Poa atropurpurea* occupied and designated Critical Habitat**
Cleveland National Forest, Barker Valley IRA

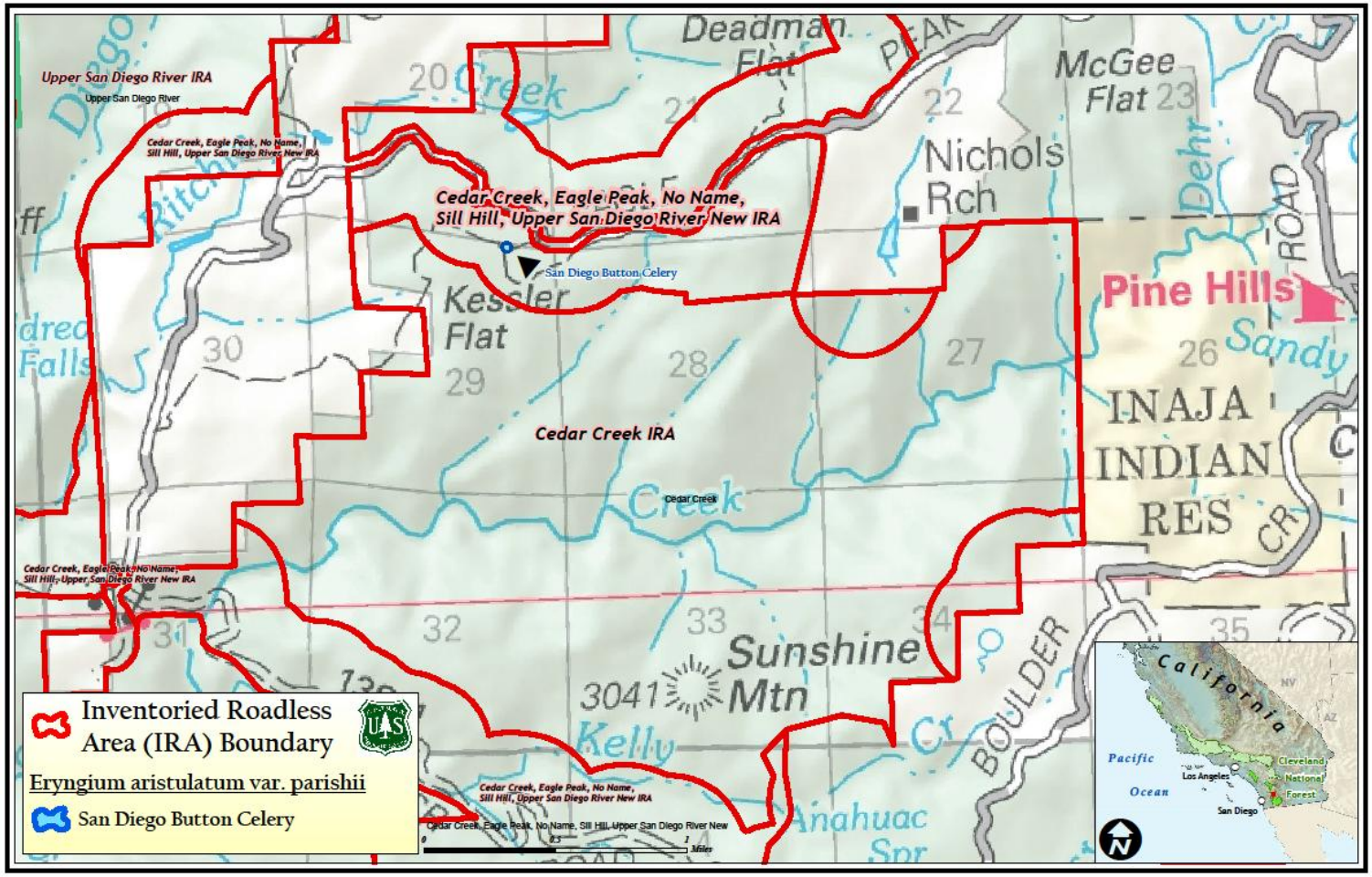
***Eryngium aristulatum* var. *parishii* occupied habitat**
Cleveland National Forest
Cedar Creek, Eagle Peak, No Name, Sill Hill, Upper San Diego River New IRA.

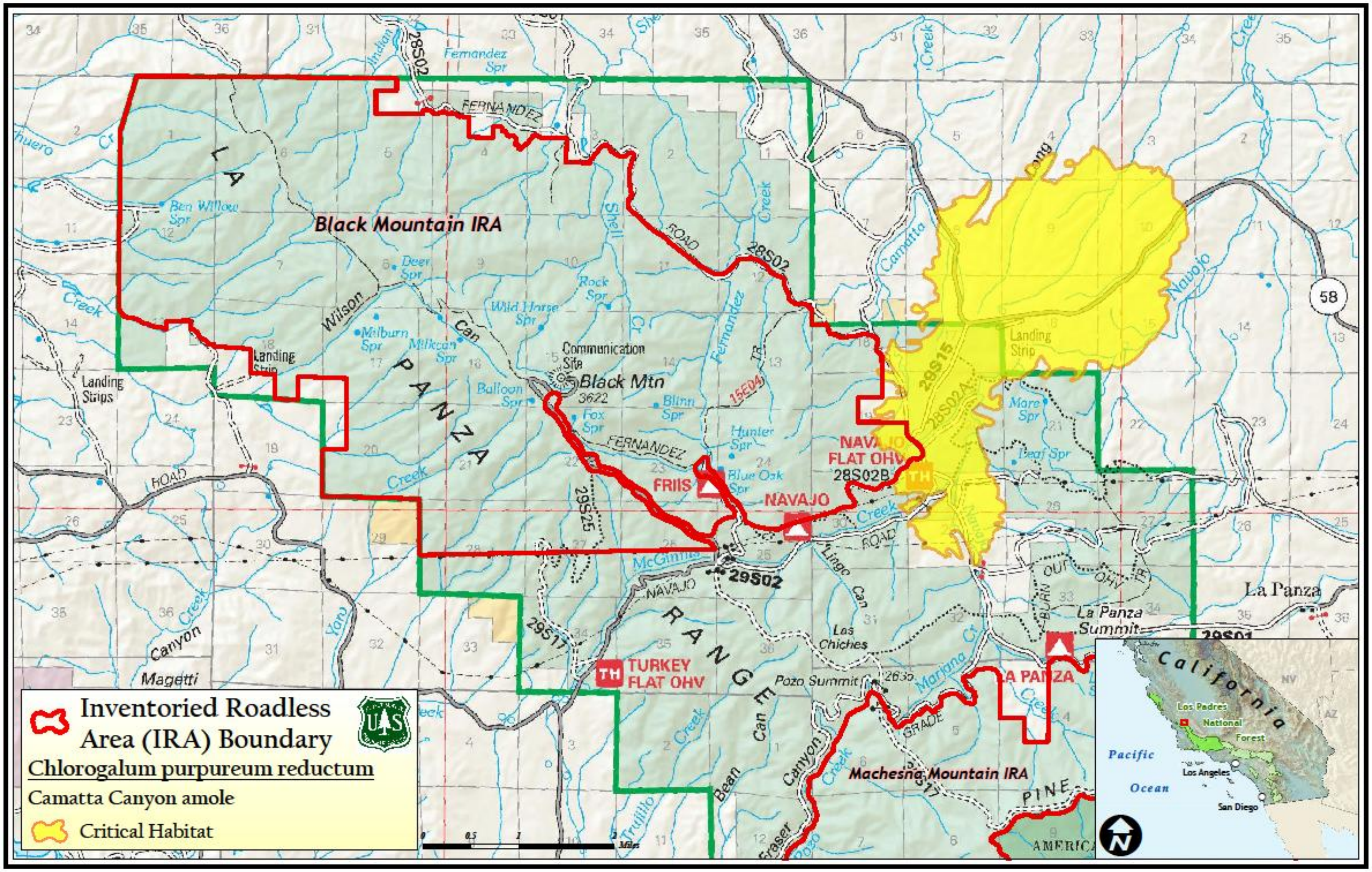
***Chlorogalum purpureum* var. *reductum* Critical Habitat**
Los Padres National Forest, Black Mountain IRA

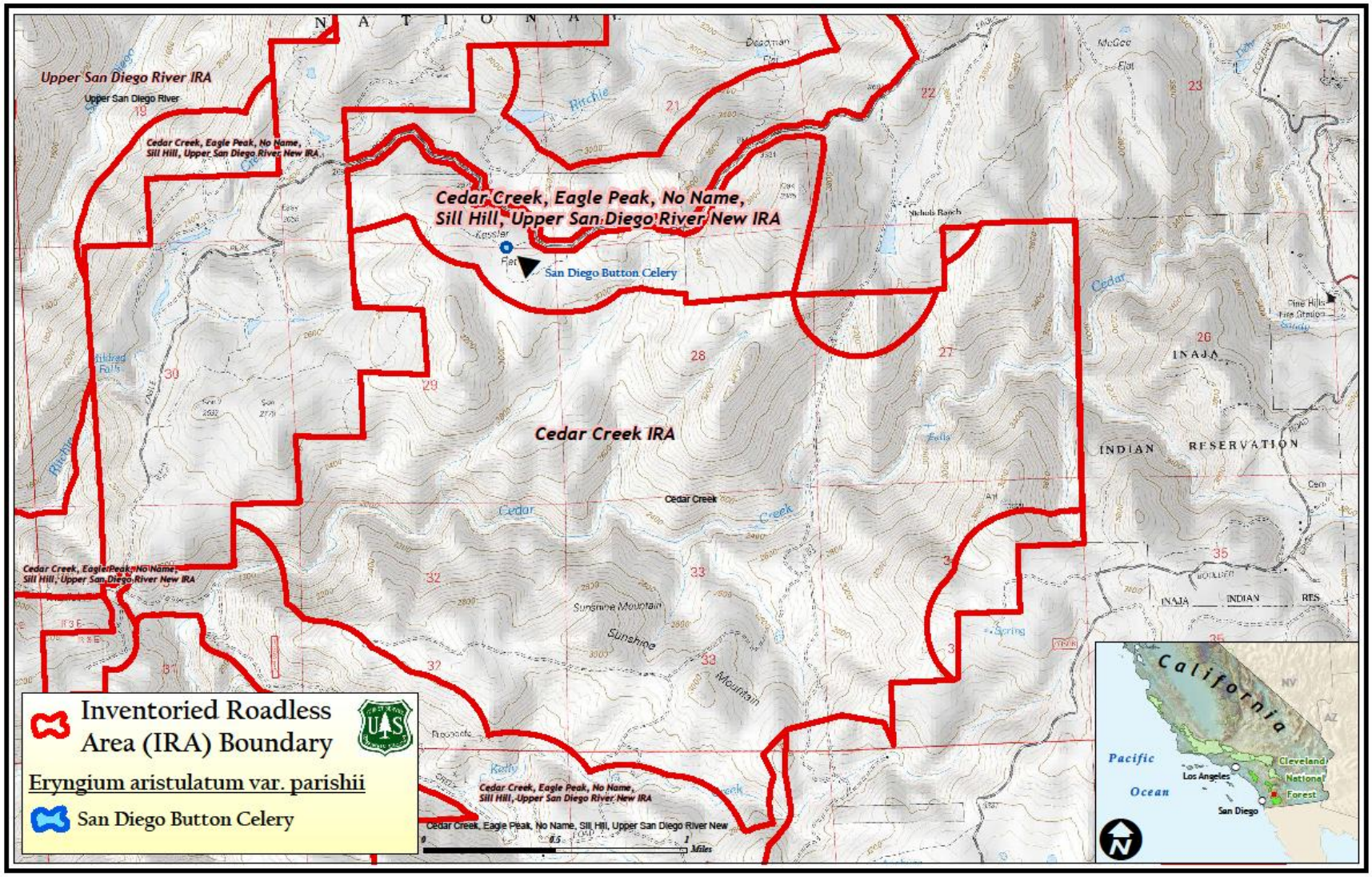
***Eryngium aristulatum* var. *parishii* occupied habitat displayed showing topographical features within the** Cleveland National Forest
Cedar Creek, Eagle Peak, No Name, Sill Hill, Upper San Diego River New IRA.

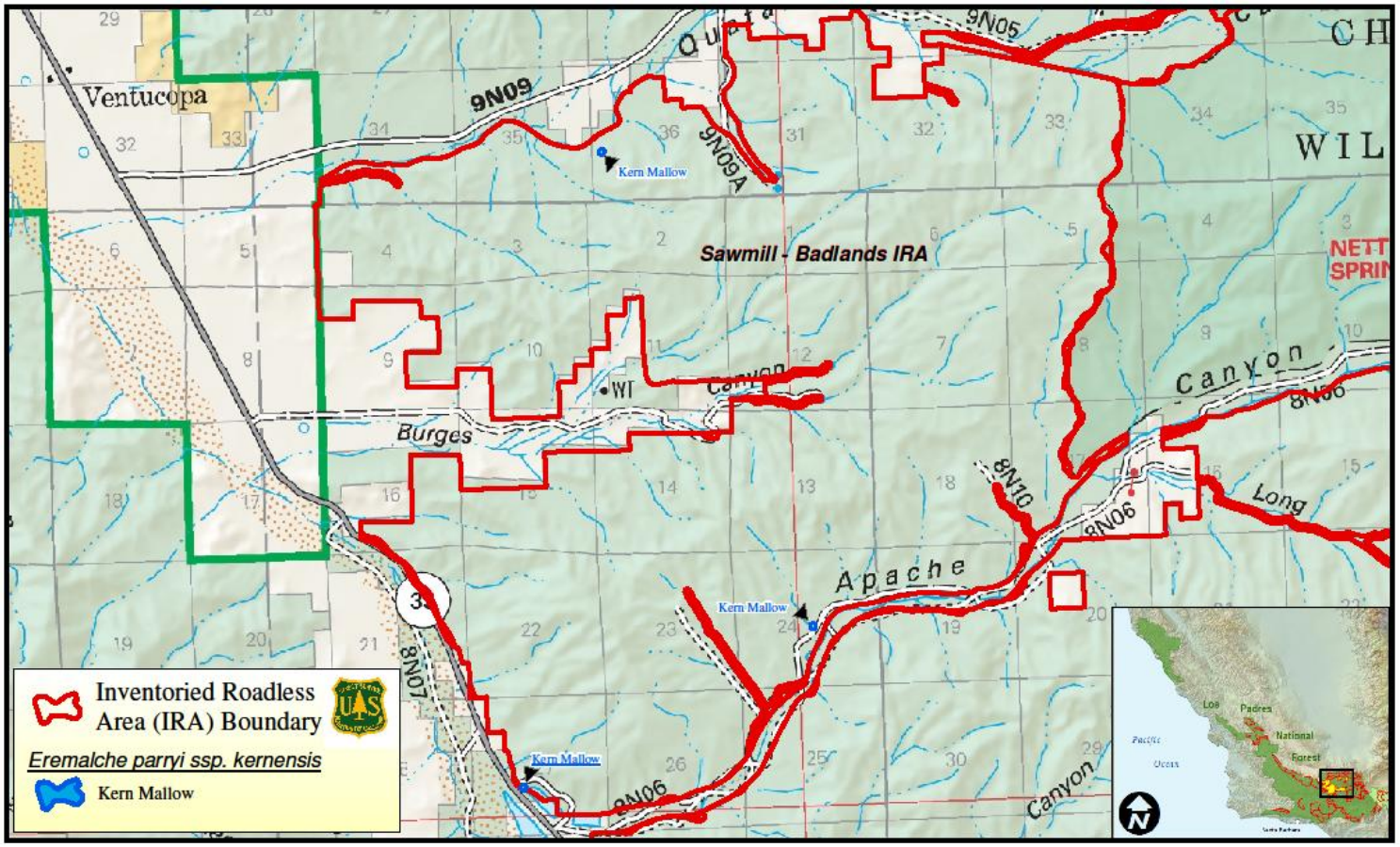
***Eremalche parryi* subsp. *kernensis* occupied habitat**
Los Padres National Forest, Sawmill Badlands IRA


Barker Valley IRA
Inventoried Roadless Area (IRA) Boundary
Poa atropurpurea
San Bernardino Bluegrass
Critical Habitat
Occurrence on FS Lands, within the IRA
Pacific Ocean
California
Los Angeles
San Diego
Cleveland National Forest


Upper San Diego River IRA
Upper San Diego River
Cedar Creek, Eagle Peak, No Name, Sill Hill, Upper San Diego River New IRA
Cedar Creek, Eagle Peak, No Name, Sill Hill, Upper San Diego River New IRA
San Diego Button Celery
Deadman Flat
McGee Flat
Nichols Rch
Kessler Flat
Pine Hills
Sandy
INAJA INDIAN RES
Cedar Creek IRA
Cedar Creek
Sunshine Mtn
3041
Kelly
Anahuac
BOULDER
Inventoried Roadless Area (IRA) Boundary
Eryngium aristulatum var. parishii
San Diego Button Celery
California
Pacific Ocean
Los Angeles
San Diego
Cleveland National Forest


Black Mountain IRA
LA PANZA RANGE
Black Mtn
3622
Communication Site
FRIIS
NAVAJO
NAVAJO FLAT OHV
TURKEY FLAT OHV
LA PANZA
Machesna Mountain IRA
La Panza
La Panza Summit
Pozo Summit
Las Chiches
Landing Strip
Landing Strips
58
28S02
29S02
28S15
29S17
29S25
29S01
Inventoried Roadless Area (IRA) Boundary
Chlorogalum purpureum reductum
Camatta Canyon amole
Critical Habitat
California
Los Padres National Forest
Pacific Ocean
Los Angeles
San Diego


Upper San Diego River IRA
Upper San Diego River
Cedar Creek, Eagle Peak, No Name, Sill Hill, Upper San Diego River New IRA
Cedar Creek, Eagle Peak, No Name, Sill Hill, Upper San Diego River New IRA
San Diego Button Celery
Cedar Creek IRA
Cedar Creek
INDIAN RESERVATION
INAJA
Sunshine Mountain
Inventoried Roadless Area (IRA) Boundary
Eryngium aristulatum var. parishii
San Diego Button Celery
Cedar Creek, Eagle Peak, No Name, Sill Hill, Upper San Diego River New
Miles
California
Pacific Ocean
Los Angeles
San Diego
Cleveland National Forest



Note: Regarding Eremalche parryi subsp. kernensis map. There is only one occurrence of Eremalche parryi subsp. kernensis on this map. It is located at the top center of the map in section 24. This is CNDDB EO # 7 and California Consortium of Herbaria specimen RSA772449. The two lower occurrences in sections 24 and 27 are NOT Eremalche parryi subsp. kernensis. They are Eremalche parryi subsp. parryi, a non-listed species put on the map in error.

APPENDIX B
THREATENED AND ENDANGERED SPECIES ACCOUNTS FOR PLANTS KNOWN TO OCCUR WITHIN IRAS

Appendix B includes the species accounts of threatened or endangered plant species known to occur within the LMP Final SEIS project area.

It includes the following species:

- **Chlorogalum purpureum var. reductum**
- **Eremalche parryi subsp. kernensis**
- **Eryngium aristulatum var. parishii**
- **Poa atropurpurea**

The *Chlorogalum purpureum* var. *reductum* and *Poa atropurpurea* accounts were created for and used for analysis of the 2006 Land Management Plan Revision. The viability assessment for those two species was retained at the end of the accounts for this project (Final SEIS) as Alternative 1 (no action) in the Final SEIS is the same as Alternative 4a, the selected alternative in the Forest Plan Revision FEIS. While these accounts have not been updated since the 2006 Forest Plan Revision, the effects analysis completed for the FSEIS used the most updated information. The current critical habitat data layers were used for *Poa atropurpurea* and *Chlorogalum purpureum* var. *reductum*.

Eremalche parryi subsp. *kernensis* and *Eryngium artistulatum* var. *parishii* were not known to occur on the Forests during the 2006 Forest Plan Revision. Accounts for both of these species were created for the Biological Assessment and the Final SEIS. Therefore, they do not include the viability assessment information found in the *Chlorogalum* and *Poa* species accounts.

Chlorogalum purpureum var. reductum

Chlorogalum purpureum Bdg. var. *reductum* Hoover (Camatta Canyon amole)

Management Status

Federal: Threatened (65 FR 14878-14888, 2000)

California: Rare

Heritage Rank: G1T1, S1.1 – very threatened (California Natural Diversity Database)

California Native Plant Society (2001): List 1B; R-E-D Code 3-3-3

Critical Habitat (CH) for *Chlorogalum purpureum* var. *reductum* was designated by the USFWS on October 24, 2002 (67FR 65413). In determining which areas to designate as CH the USFWS considers those physical and biological features that are essential to the conservation of the species and that may require special management considerations or protection. These features are termed Primary Constituent Elements (PCEs) and they are summarized in the final rule (68 FR 65413). Note: The map corrections published on April 24, 2003 (68 Federal Register 20083, U.S. Fish and Wildlife Service 2003) for *C. purpureum* var. *purpureum* had nothing to do with *C. purpureum* var. *reductum.*

General Distribution

Chlorogalum purpureum var. *reductum* is narrowly distributed on the northeast side of the La Panza Range in San Luis Obispo County. Plants occur in two discrete locations. The larger site is adjacent to State Highway 58, a two-lane road. A smaller site is occurs approximately 3 miles (4.8 kilometers) to the south (Stephenson and Calcarone 1999).

Distribution in the Planning Area

The larger of the two known occurrences occupies between 10 and 12 acres (4.0-4.9 hectares) of habitat on both private and National Forest System lands; Highway 58 bisects the occurrence. Several hundred thousand plants are estimated to occur at this location. North of the highway, the population occurs on private lands. The plants south of the highway are within the Santa Lucia Ranger District on the Los Padres National Forest. This population is patchily distributed over the plateau; it has been estimated to occupy less than 8 acres south of the highway and a smaller area on the north side. Forest Service Road 29S15, a graded dirt road about 33 feet (10 meters) wide, bisects the portion of the population on public land.

The second known locality of *Chlorogalum purpureum* var. *reductum* was first documented by botanists in the mid-1990s. It is 3 miles (4.8 kilometers) south of the Los Padres National Forest population in an area with similar soils and topography. This occurrence has been estimated to occupy less than 0.25 acre (0.1 hectare) and consists of several hundred plants in two or more patches entirely on private land.

Taxonomy and Natural History

Chlorogalum purpureum var. *reductum* is a monocot in the Liliaceae (lily family). *Chlorogalum purpureum* var. *reductum* and the other variety of the species, purple amole (*C. p.* var. *purpureum*), are the only members of the genus with bluish-purple flowers that open during the day. Variety purpureum is found further north of *Chlorogalum purpureum* var. *reductum* on the east side of the Santa Lucia Mountains in Monterey County (Jernstedt 1993). Variety *reductum* appears to be identical to variety *purpureum* except for its compact, dwarf habitat of growth (Hoover 1964). When cultivated in San Luis Obispo, Hoover (1964) reported that both varieties retained their distinctive habit when grown side by side.

Reproduction of *Chlorogalum purpureum* var. *reductum* is primarily by seed. Each flower contains six ovules, although not all develop into seeds in the wild. The species is reported to be self-compatible, and insect pollination appears to result in increased seed set. Seeds are likely dispersed by gravity. The time from germination to first reproduction may be as long as 15 years (U.S. Fish and Wildlife Service 2001).

The Los Padres National Forest has been monitoring the population dynamics of this taxon by tracking the number and age class of plants in eleven 0.5-square-meter plots. The study began in 1991 and data were collected until 1997. Analysis of the data has not yet been completed, but preliminary findings suggest that the abundance of this taxon is relatively static, with some variation on an annual basis due to dormancy, mortality, and recruitment. Recruitment of seedlings appears generally to occur in years with above-average precipitation (U.S. Fish and Wildlife Service 2001).

Habitat Description

Chlorogalum purpureum var. *reductum* occurs in grassland, oak woodland, and oak savannah at elevations of 1,000-2,050 feet (305-625 meters) in the South Coast Ranges. Like other members of the lily family, *Chlorogalum purpureum* var. *reductum* probably develops root-hyphae relationships with a fungus. These mycorrhizal relationships can aid in nutrient and water uptake by the host plant and can alter growth and competitive interactions between species (U.S. Fish and Wildlife Service 2000).

At both known locations of *Chlorogalum purpureum* var. *reductum*, the plants grow in variously sized patches and are not uniformly distributed throughout the habitat, which is described as sparsely vegetated annual grasslands surrounded by blue oak (Quercus douglasii) woodland and gray/foothill pines (*Pinus sabiniana*). Other native species found in the area include *Brodiaea coronaria*, *Clarkia purpurea*, *Crassula erecta*, *Dichelostemma capitatum*, and *Calycadenia villosa*, another sensitive species (USDA Forest Service 2000).

Chlorogalum purpureum var. *reductum* grows on well-drained red clay soils with substantial amounts of pebbles and gravels and a high (8:1) calcium:magnesium ratio (Lopez 1992). Despite reports to the contrary (Jernstedt, J. 2002), the substrate in this area is not serpentine (Lopez 1992). The taxon appears to be restricted to areas with rocky, nutrient-poor soils that tend to prevent herbivory by pocket gophers. In areas with better soils, nonnative annuals (e.g., *Bromus*

madritensis ssp. *rubens, Erodium* spp., *Schismus barbatus, Avena barbata*) appear to be out competing *Chlorogalum purpureum* var. *reductum* for space, light, nutrients, and water (U.S. Fish and Wildlife Service 2000).

Occurrence Status

Chlorogalum purpureum var. *reductum* is known from only two occurrences (California Native Plant Society 2001). Population trends are fluctuating. The number of plants in the larger occurrence varied substantially (between 56 and 500,000 plants) based on observations between 1982 and 1991 (California Natural Diversity Database 2001).

Monitoring *Chlorogalum purpureum* var. *reductum* is complicated by the life history traits of this taxon. Because the bulbs can remain dormant for many years, monitoring efforts in any given year will only detect a portion of the population. Changes in the number of plants present from year to year may be due to differences in the proportion of bulbs that produce leaves and stems and may not reflect actual changes in the abundance of the population. Furthermore, attempts to map or tag the location of plants is complicated by the shrink/swell characteristics of the soil, which make it difficult to be certain that tagged or mapped plants can be accurately tracked over time (USDA Forest Service 2000).

A study on National Forest System lands (Koch 1997) is investigating the efficacy of establishing new individuals in areas that have been subject to soil compaction as opposed to areas that have not been subject to soil compaction. Two-year study results indicate that germination rates and survivorship of planted seeds is reduced in compacted soils. This suggests that the species' abundance in undisturbed areas has probably declined in comparison with areas where there has been off-highway vehicle (OHV) trespass. The extent of compacted soils has not been determined or estimated.

Monitoring along a 330-foot transect showed that plant numbers were relatively stable along the transect between 1991 and 1997 (U.S. Fish and Wildlife Service 2001). This transect is not located in an area where OHV trespass has continued to occur and is, therefore, not representative of the status of the population in areas subject to OHV activity. The portion of the population where the transect is located is accessible to livestock.

OCCURRENCE DATA – *Chlorogalum pupureum* var. *reductum* (Camatta Canyon amole)

Occurrence No. (CNDDB)	No. of Plants	Year Reported	Location/Land Owner	County
1	1000+ in ’82, 56 in ’87, 90 in’88, 500,000 in 1991	2002	ENTRANCE TO LOS PADRES NF, ALONG NAVAJO RD, BOTH SIDES OF HWY 58, 8.3 MI E OF JCT HWY 58 & HUERHUERO-LA PANZA RD. ALSO IN SECTION 20 AND 8. GRAZING EXCLOSURE LOCATED AT NAD27 747091E 3920622N (2003),	SLO

			T29S/R16E/S17	

- SLO = San Luis Obispo

Threats

Forest Road 29S15, the graded dirt road that bisects the large population on public land, leads to private inholdings and residences within the Los Padres National Forest. This road is bounded on either side by a pipe barrier that was installed in about 1990 to prevent OHVs from using the site. A removable portion of the barrier and a barbed-wire section of fence have been routinely breached by OHVs. Such illegal use was noted to be increasing from 1995 through 1997 (U.S. Fish and Wildlife Service 2001). In 1998, after publication of the proposed rule to list the species (U.S. Fish and Wildlife Service 1998), the broken section of barbed wire fence was replaced with a single-post barrier, and sections of broken pipe barrier elsewhere were rewelded. Stephenson and Calcarone (1999) reported that despite being partially fenced, the area was still being used as an informal staging area for OHVs and cattle. However, monitoring of habitat in 2002, 2003, 2004, showed that the welded pipe barrier has proven to be an effective deterrent to unauthorized use of *C. purpureum* var. *reductum* habitat by OHV's. On average, only one trespass per year has been noted, and these events have resulted in only minor damage to plants and habitat. Monitoring of habitat from 2002- 2004 has also shown that livestock use of occupied habitat has either not occurred (2002) or in 2003- 2005 was very minimal (USDA Forest Service 2005).

Maintenance grading of Forest Road 29S15, which is about 33 feet (10 meters) wide, is directly affecting *Chlorogalum purpureum* var. *reductum*. In recent years, grading has increased the width of the road by about 5-10 feet (1.5-3.0 meters), resulting in the loss of additional plants and habitat. The road may indirectly affect *Chlorogalum purpureum* var. *reductum* habitat by altering local hydrologic function. Equipment used in the maintenance of this road can carry propagules of nonnative plants, potentially leading to the unintentional introduction of nonnative undesirable plant species. However, nonnative plants that are tolerant of the dry soils (e.g., *Bromus* sp. and *Erodium* sp.) are already present on site and have been a part of the annual grassland flora for more than 100 years. Other nonnative plant species, such as *Centaurea soltitialis*, have not been able to persist on site, and the risk of introducing seed from other nonnative species is low (U.S. Fish and Wildlife Service 2001).

A few plants extend into the California Department of Transportation (Caltrans) right-of-way along the highway. Caltrans has designated both sides of the right-of-way in this area as Botanical Management Areas.

One cattle-grazing allotment overlaps the area occupied by the *Chlorogalum purpureum* var. *reductum*; livestock grazing occurs February-May. Livestock can trample and eat the aboveground portions of the plant and compact soils to the degree that plants may be unable to extend roots or stems or acquire water. The timing and extent of livestock use in the area where *Chlorogalum purpureum* var. *reductum* grows exerts substantial influence on the effects of grazing. The effects of livestock grazing on this taxon need further evaluation (U.S. Fish and Wildlife Service 2001).

Conservation and Management Considerations

Conservation measures that could be considered include minimization and avoidance measures for grazing, range improvement, fire control, and road and OHV management. Research on the effects of livestock grazing on *Chlorogalum purpureum* var. *reductum* should consider direct effects such as trampling, soil compaction, and herbivory, as well as indirect effects such as the potential reduction in the competition posed by nonnative annual grasses. This research may also need to explore the relationship between hoof impacts from livestock on cryptobiotic crusts and the germination and establishment of nonnative grasses.

Evaluation of Current Situation and Risks on National Forest System Lands

Chlorogalum purpureum var. *reductum* is a very narrow endemic and is affected by road use, road maintenance, grazing, off highway vehicle use, and dispersed recreation.

Based upon the above analysis *Chlorogalum purpureum* var. *reductum* has been assigned the following threat category:

5. Uncommon, narrow endemic, disjunct, or peripheral in the Plan area with substantial threats to persistence or distribution from Forest Service activities.

Viability Outcomes for National Forest System Lands

Predicted Outcomes by Alternative

1	2	3	4	4a	5	6
B	B	B	B	B	C	A

Chlorogalum purpureum var. *reductum* is listed under the Endangered Species Act of 1973, as amended, as threatened, which assures that any new project proposed in or near its habitat will undergo considerable analysis and be subject to consultation with the USFWS at the site-specific level.

Habitat for *Chlorogalum purpureum* var. *reductum* has been fragmented by the construction of Red Hill Road through the midst of the occurrence and degraded, to a small extent, by livestock grazing and unauthorized off road travel. Impacts from off road travel may persist for years. The amount and quality of habitat has been stable and would remain stable under Alternatives 1, 2, 3, and 4. Alternative 4a would emphasize more controlled growth of recreation, including OHV use and potential OHV trespass onto potential habitat. Under Alternative 5, an increased emphasis on motor vehicle based recreation could lead to additional off road and off trail impacts to habitat for *Chlorogalum purpureum* var. *reductum*. Under Alternative 6, less emphasis on recreation, especially off highway vehicle recreation, and the potential for decreased grazing, would combine to allow for the restoration of lost and degraded habitat.

Although the amount of habitat for *Chlorogalum purpureum* var. *reductum* is very limited and some habitat has been lost as result of road construction and use, current activities and uses do

not appear to be substantially degrading this habitat and no habitat is expected to be lost under any of the proposed alternatives.

In Alternatives 2-6, 31 acres of occupied habitat of *Chlorogalum purpureum* var. *reductum* found on either side of Red Hill Road would be located in the recommended Camatta Botanical Special Interest Area (SIA) and this SIA designation would provide management direction for the protection of *Chlorogalum purpureum* var. *reductum* habitat. Fifty five acres of designated Critical Habitat would be protected under this recommended SIA in Alternatives 2-6. Under these alternatives, use of Standard S33 within the recommended SIA would add additional protection as new projects are proposed. Under Alternative 6, occupied *Chlorogalum purpureum* var. *reductum* habitat along either side of Red Hill Road would be within a Critical Biological land use zone and this designation would ensure that *Chlorogalum purpureum* var. *reductum* habitat would receive an even higher level of protection.

Viability Outcomes for All Lands Within Range of the Taxon

Predicted Outcomes by Alternative

1	2	3	4	4a	5	6
C	C	C	C	C	C	B

Although habitat not on National Forest System land (i.e., land managed by CalTrans along Highway 58 and by private landowners to the north and south of occupied habitat on NFS land) is degraded, plants continue to persist at all three locations and have the potential for continued persistence unless current land use practices change substantially.

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Eremalche parryi subsp. *kernensis* (C. B. Wolf) D. M. Bates (Kern mallow)

Known ☒ Potential ☐

Table 1. Management Status by government and private agencies (CNDDB 2013, CNPS 2013)

Federal Listing Status	Designated or proposed Critical Habitat	Recovery Plan	State listing status	Heritage Rank	California Rare Plant Rank	Other Lists
FE	No	Yes	None	G3?T2Q/S2	1B.1	

Plant Description: *Eremalche parryi* subsp. *kernensis* (Figure 1) is a gynodioecious (bisexual or pistillate plant) herbaceous annual that typically flowers March–May (CCH 2013, CNPS 2013). The more or less hollow stems are erect, ca. 2.5–50 cm in length, often with dense stellate trichomes near the tips. The deeply lobed (3–5) leaf is 2–5 cm wide. Inflorescences contain flowers that are greater in size than leaves with bractlets measuring 3–10 mm. The calyx is 3–10 mm in length with lobes measuring 3.5–8 mm long and 1.5–3.5 mm wide. The flowers are white to more or less purple (drying darker), have five petals. Typically the pistillate flowers are smaller than the bisexual flowers. The styles, with head-like stigmas, are longer than the filament tubes. Fruits contain ca. 9–19 segments and are wedge-shaped in cross section (Andreasen & Bates 2012). The pistillate flowers often produce more seeds (8–19 per fruit) than bisexual flowers (7–13 per fruit) (Mazer et al. 1993).

Figure 1. Pistillate flowers of *Eremalche parryi* subsp. *kernensis* exhibiting the white and purple floral forms. Photo Credit: Neal Kramer 2013 (left) & 2011 (right): CalPhotos.

Taxonomy: *Eremalche* is a member of Malvaceae and was originally described by E. L. Greene (1906) to resolve some inconsistencies within the genus *Malvastrum* A. Gray. In his description, three desert annual species: *Malvastrum parryi*, *M. exile* and *M. rotundifolium* were transferred to *Eremalche*. This classification was ignored by some authors who recognized *Malvastrum* under the genus *Sphaeralcea* (Rydberg 1913; Jepson 1925,1936). Wolf (1938) later reinstated *Eremalche* and added a fourth species, *E. kernensis*, based on a specimen collected in the Temblor Valley north of McKittrick in Kern County. This classification did not gain acceptance until the later treatments of Wiggins (1951), and Kearny (1956). Kearney however suggested that *E. kernensis* was not distinct from *E. parryi*, stating that *E. kernensis* is a hybrid of *E. parryi* and *E. exilis*. Twisselman (1967) later suggested that *E. kernensis* might be a subspecies of *E. parryi*, and Hoover considered *E. kernensis* to be a localized form of *E. parryi* (Hoover 1970). In a systematics study based on morphology, Leonelli (1986), investigated the relationship between *E. kernensis, E. parryi* and *E. exilis* and results showed that *E. kernensis* and *E. parryi* were both highly variable and thus proposed a new classification, however this was not validly published. Most recently, Bates (1992) treated *Eremalche kernensis* as a subspecies of *E. parryi*, which is how this taxon is currently treated (Andreasen, K. and D. M. Bates 2012).

Results of a phylogenetic study based on nuclear (nrITS + ETS) and chloroplast (*rpl-16*) gene regions (Andreasen 2012) support the monophyly of *Eremalche* with strong bootstrap support. *Eremalche parryi* subsp. *kernensis* is sister to a clade containing *E. parryi* subsp. *parryi* and *E. exilis* in both the combined data and nuclear data analyses. Relationships among the three taxa however are not resolved in the chloroplast analysis. Additional individuals need to be investigated in order to evaluate the status of the endangered taxon (see Andreasen et al. 2002; Andreasen 2005, Andreasen 2012). Population genetic research has not shown evidence of gene flow between sympatric populations of *E. parryi* subsp. *kernensis* and *E. exilis* (Andreasen et al. 2002; Cypher 2002; Andreasen 2005).

Identification: Separating *Eremalche parryi* subsp. *kernensis* from other taxa in *Eremalche* (with the exception of *E. rotundifolia*) can be challenging. *Eremalche parryi* subsp. *kernensis* is the only member of the genus exhibiting gynodioecy; all of the other members have bisexual flowers (Bates 1992; Andreasen and Bates 2012). In addition, plants often exhibit smaller bractlets and calyces, white flowers, and fruits with less segments in comparison to *E. parryi* subsp. *parryi*.

General Distribution: *Eremalche parryi* subsp. *kernensis* is a California endemic. Elevation typically ranges from 240–1524 m (CCH 2013, CNPS 2013, USFWS 2013). The original species description delineates its range as the area between the towns of McKittrick and Buttonwillow, in the Temblor Valley in western Kern County, California (Wolf 1938, USFWS 2013). The Recovery Plan (USFWS 1998) recognized populations of pink-flowered plants in Kern, Santa Barbara, and Tulare counties. However, many of the records in the San Joaquin Valley were misidentified and are *E. exilis* (Andreasen et al. 2002). As a result, the range of *E. parryi* subsp. *kernensis* was restricted to a narrow band along Lokern Road in western Kern County (Cypher 2002, 2004, USFWS 2013). Since then, extant populations of *E. parryi* subsp. *kernensis* have been found at locations in San Luis Obispo, Santa Barbara, Tulare and Ventura counties (USFWS 2013).

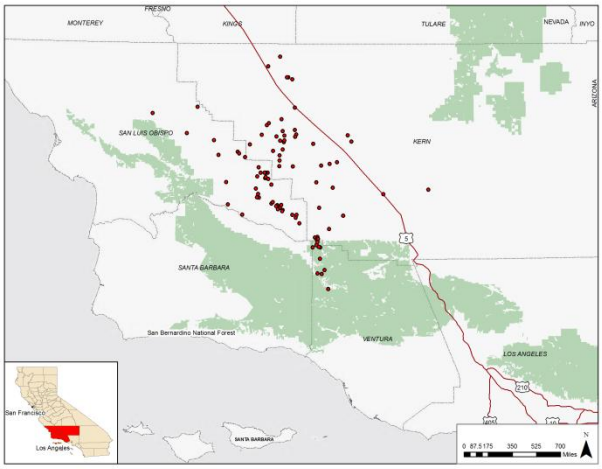

Figure 2: Distribution of the *Eremalche parryi* subsp. *kernensis* in California

Distribution in R5: According to the CNDDB (2013), EO #s 85, 86, 87, 107*, 111*-115*, and 117* occur on USFS land in the Los Padres National Forest near Ballinger Campground, in Ballinger Canyon, in the western San Emigdio Mountains, Ventura County (see Figure 2 and Table 2).

Habitat Description: Typically, *E. parryi* subsp. *kernensis* favor areas where shrub cover is < 25% and average herbaceous cover ranges from 48–80% (USFWS 2013). It is predominately known to occur in arid habitats including alkali flats and eroded hillsides of the southern San Joaquin Valley and adjacent areas. In addition, *E. parryi* subsp. *kernensis* can grows a variety of arid habitats depending on its elevation. At the lower elevations up to about 610 meters (2,000 ft), *E. parryi* subsp. *kernensis* is found in grassland and saltbush scrub habitat on substrates often described as alkaline, alluvial, shale, clay, and dry sandy loam. At mid-range elevations between about 610 and 914 meters (about 2,000 and 3,000 feet), the subspecies is commonly associated with *Ephedra californica* and at higher elevations, above 914 meters (3,000 ft), *E. parryi* subsp. *kernensis* occurs in juniper woodland, on gravel and shale substrates (USFWS 2013).

Associated species: *Amsinckia vernicosa, Atriplex canescens, A. polycarpa, A. spinifera, Arctostaphylos glauca, Artemisia tridentata, Bromus madritensis* subsp. *rubens, Chrysothamnus nauseosus, Eastwoodia elegans, Ephedra californica, Ericameria linearifolia, Erodium cicutarium, Eriogonum fasciculatum, Hymenoclea salsola, Lasthenia minor, Layia pentachaeta* ssp. *albida, Juniperus californica, Lycium andersonii, Medicago* sp., *Purshia tridentata, Quercus john-tuckeri, Schismus barbatus, Vulpia microstachys*, and *Yucca whipplei* (CCH 2013, CNDDB 2013, USFWS 2013).

Occurrence status and population trends: Since *E. parryi* subsp. *kernensis* is an arid-land annual, the phenology, reproduction, and population size can vary greatly depending on rainfall / drought cycles. As a result, population trends and occurrence status are quite variable. For example, records can vary from year to year, and a lack of plants at a location one year can be followed by hundreds the next (USFWS 2013). In terms of examining population trends, most are not known since records have only been surveyed once. In particular, populations trends are not known for the EOs occurring on USFS land in the Los Padres National Forest (CNDDB 2013). According to the CNDDB (2013), EO #s 4 and 15, both from Kern Co., are considered extirpated and EO# 24 (also Kern Co.) is possibly extirpated.

Threats or other information: Threats to *E. parryi* subsp. *kernensis* identified in the 1990 final listing rule include destruction and modification of habitat due to agricultural land conversion, water development and exploration, off-road vehicle use, oil and gas exploration, road maintenance and expansion, and mineral extraction (USFWS 2013). Presently, these factors continue to threaten the subspecies, along with the added threats of a high speed rail construction and the construction and operation of solar facilities. In addition, grazing and competition from non-native plant species continue to be threats for the subspecies. Grazing is often used as a habitat management tool throughout the range of *E. parryi* subsp. *kernensis* on Federal lands to eliminate competition from both non-native and native competitors (USFWS 2013). Livestock grazing occurs on the Carrizo Plain National Monument, the LPNF, and is being considered for the Bitter Creek National Wildlife Refuge (CNDDB 2013, USFWS 2013). The increased productivity of non-native annual grasses can also lead to increased fire frequency due to the build-up of fuel. *Eremalche parryi* subsp. *kernensis* does not occur in fire-adapted habitats and thus the native vegetation does not recover quickly after burning (USFWS 2013). The most recent report on the subspecies from the USFWS (2012) lists that of the known occurrences 59% are located on Federal lands and are subject to grazing, off-highway vehicles or other uses; 35% are located on private land or land where the ownership status was not known and only 2% were protected on state-owned preserves.

Table 2. Occurrences of *Eremalche parryi* subsp. *kernensis* listed in the CNDDB (2013). EO * = occurrences not listed in the CNDDB. The EO numbers correspond with labeled locations in Figure 2. (ACEC=Area of Critical Environmental Concern; BLM=Bureau of Land Management; CNLM = Center for Natural Lands Management; DFG= Dept. of Fish and Game; DOD=Department of Defense; DPR=Department of Parks and Recreation; NF=National Forest; NWR=National Wildlife Refuge; OHV=Off-Highway Vehicles; PVT=Private, SP=State Park, UNK= unknown; USFS= U.S. Forest Service and USFWS= U.S. Fish and Wildlife Service).

EO	County	Quad	Date (D/M/Y)	Location	Land Manager	Elev (ft)	Threats	General Comments
1	Kern	West Elk Hills	29/03/2010	Between west side canal and Lost Hills Rd, from about 3 miles north to about 2 miles south of Lokern Rd, west of Lokern.	PVT, DFG, CNLM, DWR	400	Threats include grazing, transmission line corridor, petroleum development, roads, vehicular traffic, herbicides, etc.	10,000+ in 1986. 1000s in 1988, 1989, & 1992. >50,000 in 2004 between this occurrence and #28, 47, 48, 82, and 83 combined. 100,000+ along Lokern Rd in 2009. 1000s in W portion of site in 2010. Includes former occurrences #3, 29, 40 and 41.
2	Kern	West Elk Hills	27/03/2009	Approximately 2-4 air miles north of Mckittrick, mostly between Highway 33 and Highway 58, west of the Elk Hills.	BLM, PVT	700	Grazing, petroleum development activity, and energy transmission line in the area.	500-1000 plants observed in W 1/2 Sec 32 in 1986, 1991, 1993. 10,000+ in Sec 4 in 1989. 1 plant in SE corner of Sec 5 in 2008. S-most poly & W-most poly need id confirmed; only *E. exilis* observed in '08/'09. Incl former EO #34, 35, 36, 38.
4	Kern	Lost Hills NW	1986	5 miles north of Lost Hills.	PVT	230	Nearly all of the region in the potential vicinity of this collection is given over to agriculture; habitat eliminated.	Taylor (1986) unable to locate the Hoover specimen; collection may prove to be *E. parryi* since it is out of range for *E. kernensis* (referring to range defined by Taylor) but needs to be examined to confirm determination (Taylor, 1995).
5	Kern	Lost Hills NE	17/03/1965	South end of Kern National Wildlife Refuge.	USFWS-KERN NWR	225		Site based on a 1965 Twisselmann collection. A 1954 Twisselmann collection from "10 miles north of Lost Hills" is also attributed to this site. Needs fieldwork.
8	San Luis Obispo	Elkhorn Hills	20/04/1952	Southernmost end of the Carrizo Plain about 4 miles from the Kern County line.	BLM-CARRIZO PLAIN NM	2850		Only source of information for this site is a 1952 Robbins & Bacigalupi collection. Needs fieldwork.
9	San Luis Obispo	Elkhorn Hills	06/05/1978	12 miles north of junction of Hwy 166 along Soda Lake Road, Carrizo Plain.	UNK	2250		Only source of information for this site is a 1978 keil collection. Needs fieldwork.

EO	County	Quad	Date (D/M/Y)	Location	Land Manager	Elev (ft)	Threats	General Comments
10	San Luis Obispo	Panorama Hills	19/07/1952	8 miles south of Soda Lake, Carrizo Plain.	BLM-CARRIZO PLAIN NM	2000		Only source of information for this site is a 1952 McMillan collection. Needs fieldwork.
11	San Luis Obispo	Panorama Hills	25/05/1983	Crocker Grade; along unnamed road heading SE off of Hurricane / Crocker Springs Road, Temblor Range.	BLM-CARRIZO PLAIN NM	3250	One old gypsum pit nearby.	<10 plants observed in 1983.
13	San Luis Obispo	Panorama Hills	11/04/2011	Along Elkhorn Road, 1.1 road miles NW of Hurricane Road, Elkhorn Plain,	BLM-CARRIZO PLAIN NM	2430	Area is used for cattle grazing.	Approximately 20 plants observed in 2011. Includes former EO #17.
15	Kern	Reward	1986	7 miles NW of Mckittrick, Temblor Valley.	PVT	900	Extirpated; habitat modified by intensive oil and gas development.	This site is the type locality. Now extirpated.
18	San Luis Obispo	Panorama Hills	19780527	2.5 miles NW of Hurricane Road along Soda Lake road, Carrizo Plain.	DFG-CARRIZO PLAINS ER	2050		Only source of information for this site is a 1978 Woods collection. Needs fieldwork.
19	San Luis Obispo	Simmler	12/05/1958	2 miles north of Soda Lake, Carrizo Plain.	PVT	2050		Only source of information for this site is a 1958 Twisselmann collection. Needs fieldwork.
20	San Luis Obispo	La Panza Ranch	13/04/2001	Highway 58, circa 1 road mile east of San Juan Creek Bridge, east of La Panza.	PVT	1700		Main source of information for occurrence is a 2001 collection by Keil. 1936 Eastwood collection from "7 mi E of La Panza" and 1965 Hoover collection from "hill just E of San Juan river" also attributed here. Includes former EO #21.
23	Kern	Belridge	1986	South Belridge oil field; west of Lost Hills Rd. 1.3 miles SSW of Missouri Triangle.	PVT	620	Population located in buffer zone of proposed cogeneration project.	Map was the only information in 1986.
24	Kern	Belridge	27/03/2009	South Belridge Oil Field; 0.5 mile southeast of Missouri Triangle, east side Highway 33.	PVT	550	Population located in buffer zone of proposed cogeneration project. Oil production facilities in area.	Map was the only information in 1986. In 2009, area was heavily disturbed; no *Eremalche* observed and habitat no longer appears to be suitable.
25	Kern	Fellows	17/04/1986	Buena Vista Creek, approximately 1.8 air miles west of Derby Acres, Telephone Hills.	PVT	1750	Within transmission line corridor. Possibly threatened by oil development.	1 plant observed in 1986.
26	Kern	West Elk Hills	17/04/1986	Approximately 2 air miles NW of Derby Acres, Telephone Hills.	BLM, PVT	1550	Within transmission line corridor. Possibly threatened by oil development.	9 colonies observed in 1986; hundreds of plants in total.

EO	County	Quad	Date (D/M/Y)	Location	Land Manager	Elev (ft)	Threats	General Comments
28	Kern	West Elk Hills	25/03/2008	Both sides of California aqueduct, 0.4-1.5 miles southeast of Highway 58, north of Elk Hills.	PVT, DFG-LOKERN ER	325	Activities associated with transmission line.	>600 plants observed in 1986. Hundreds in northern polygon in 1992. >50,000 in 2004 between this occurrence and EOs #1, 47, 48, 82 & 83. 100s in n polygon, no plants in n end of n polygon, few in s polygon in 2008. Includes former EO #49.
30	Kern	Coal Oil Canyon	29/04/1986	Kern Lake Preserve, Kern Lake bed.	PVT	300	Visitor trampling.	Only 1 plant observed in 1986 but it was past peak flowering period for the plant.
31	Kern	Lost Hills NE	22/04/1987	Semitropic ridge, north of Highway 46 and east of Corcoran Road, east of Lost Hills.	CNLM, PVT	240		In 1987, the 3 northernmost polygons had a total of 59-85+ plants and the 3 southernmost polygons had a total of 85-110+ plants.
32	Kern	Lost Hills NE	1987	Paine Preserve, Semitropic Ridge; Corcoran Road about 1.5 miles north of McCombs road, east of Lost Hills.	CNLM	235		Site based on a 1987 TNC monitoring report. Vague collections from "Paine Nature Preserve," "Paul Paine Memorial Wildflower Preserve," and "Paine Preserve" attributed to this site.
33	Kern	Lost Hills NE	27/04/1987	semitropic ecological reserve; ~0.4 air mi west of Corcoran rd and ~1.5 miles north of McCombs Rd, E of Lost Hills.	DFG-SEMITROPIC ER	240	Site has been used for sheep grazing.	1 plant observed in 1987.
37	Kern	West Elk Hills	26/03/2008	About 3 air miles NNE of McKittrick along Highway 58, east of highway along Pipeline Route.	PVT	650	Transmission line construction, area has been grazed by sheep in the past.	1 plant in vegetative state observed in 1986. Approx. 30 plants observed in 2008. 1998 Hrusa collection from " attributed to this occurrence.
39	Kern	West Elk Hills	26/03/2008	About 1 mile east of Lokern pumping plant, west of California aqueduct and northeast of McKittrick.	PVT	350		Original source of information for this site was map detail from CEC. No plants observed in 2008, possibly due to lack of rain; very dry (<2").
42	Kern	Lokern	26/03/2008	Lokern, near junction of Lokern Road and Highway 58.	UNK	275	Annual grasses.	50 plants observed in 1988. No plants observed in 2008; searched area within 200 m of Hwy 58 along north side of road.
43	Kern	Lokern	26/03/1995	Just north of Lerdo Highway and west of interstate 5, about 23 road miles south of Kern/Kings County line.	UNK	275	Annual grasses may be affecting native species numbers and diversity.	Flowers pink/lavender. Keyed clearly to *E. kernensis* in Jepson Manual acc to White (1995); has calyx characters; some flowers pistillate only (S. White, 1995).
44	Kern	Fellows	07/03/1988	Elk Hills Prison site just north of Buena Vista Hills, east side of Hwy 33, 1.5 miles east of Midway Pumping Station.	UNK	275		Only source of information for this site is 1988 collection by Jokerst.
45	Kern	West Elk Hills	27/03/2009	On the east side of Highway 33 approximately 1.5 miles south of McKittrick.	PVT, BLM	1350		Hundreds (possibly thousands) of plants observed in 1986. Observed by Jokerst in the SW 1/4 of the SW 1/4 of Section 28 in 1989. 1000s of gynodioecious plants present in 2009; but plants could be *E. parryi.* Includes former occurrence #27.

EO	County	Quad	Date (D/M/Y)	Location	Land Manager	Elev (ft)	Threats	General Comments
46	Kern	Taft	08/05/1991	FBOP Prison site along Pipeline Route E & adjacent to Airport Rd, 250 m n of 4-way junction summit of Buena Vista Hills.	BLM	950		Only source of information for this site is 1991 collection by Jokerst. Needs fieldwork.
47	Kern	Reward	31/03/2004	Lokern natural area, east of Highway 33 about 0.7 air mile SE of junction with Cymric Road.	PVT, BLM	570		More than 50,000 plants observed in 2004 between this occurrence and occurrences 1, 28, 48, 82, and 83 combined.
48	Kern	West Elk Hills	31/03/2004	Lokern Natural Area, just north of Highway 58, about 3.5 miles north of McKittrick.	PVT	600		More than 50,000 plants observed in 2004 between this occurrence and occurrences 1, 28, 47, 82, and 83 combined.
52	Kern	Santiago Creek	2010	Bitter Creek National Wildlife Refuge; Bitter Creek Cyn ~3.5 air mi ENE of Cerro Noroeste & Klipstein Cyn Rd junction.	USFWS-BITTER CREEK NWR	1900		10 plants observed in 2009. No plants observed during a subsequent survey in 2010.
53	Kern	Ballinger Canyon	03/05/2010	West side of the refuge, just south of BM 4240, San Emigdio Mtns.	USFWS-BITTER CREEK NWR	4242	Near dirt road used by local residents.	500 plants observed in 2010.
54	Kern	Ballinger Canyon	03/05/2010	West side of refuge, about 0.3 air mile SSE & SE of Peak 4002, San Emigdio Mtns.	USFWS-BITTER CREEK NWR	4000	Near dirt road used by local residents.	In 2010, 1000 plants were observed in SW polygon and an unknown number of plants were observed in ne polygon.
55	Kern	Ballinger Canyon	27/04/2010	West side of refuge, about 0.2 air mile WSWof Peak 4002, San Emigdio Mtns.	USFWS-BITTER CREEK NWR	3900		2000 plants observed in 2010.
56	Kern	Ballinger Canyon	13/05/2010	West side of refuge, about 0.75 air mile SSE of Peak 4002, San Emigdio Mtns.	USFWS-BITTER CREEK NWR	4130		Only source of information for this site is a 2010 Gross & Conway collection.
57	Kern	Ballinger Canyon	06/05/2010	West side of refuge, at Peak 4334 and ~0.25 air mi N of peak, San Emigdio Mtns.	USFWS-BITTER CREEK NWR	4250		Unknown number of plants observed in 2009 in southern polygon. ~3000+ plants observed in 2010 in northern polygon.
58	Kern	Arvin	16/04/2011	Approximately 1/2 mile east of Comanche Spring, south of Arvin, Tejon Hills.	PVT	800		Site based on 2011 Kramer photos. A 1982 Shevock et al. Collection from "Comanche Point, 1100 feet" is also attributed to this site. Needs fieldwork.
59	Kern	Pentland	16/04/1991	NW corner of Wind Wolves Preserve between Santiago Creek and Muddy Creek, SE of Maricopa Oil Fields.	TWC-WIND WOLVES PRESERVE	1080	Moderate amount of cattle grazing in 1991.	45 plants observed in 1991. In 1991, site was on a Celeron Pipeline Easement; site now appears to be part of the Wildlands Conservancy-Wind Wolves Preserve. Need map detail for this site.
60	Kern	Maricopa	05/03/1991	Just south of Maricopa; about 1/2 mile south of Maricopa High School, Maricopa Oil Field.	PVT	900	Orvs, roads, blading of surface, construction. Near maricopa high school.	11 plants observed in 1991. Nearby were a few *Eremalche parryi* plants on hillside.
61	San Luis Obispo	Elkhorn Hills	20/05/2011	South end of the Carrizo Plain, about 2 air miles NE of Padrones Spring, Elkhorn Hills.	BLM-CARRIZO PLAIN NM	2700	Area is used for cattle grazing.	Approximately 2000 plants observed in SW polygon, 3 in northern polygon, and approximately 300 plants observed in se polygon in

EO	County	Quad	Date (D/M/Y)	Location	Land Manager	Elev (ft)	Threats	General Comments
								2011.
62	San Luis Obispo	Wells Ranch	30/03/2011	South end of the Carrizo plain; about 1.4 air miles SW of Le Travers Ranch, between Temblor Range and Caliente Range.	BLM-CARRIZO PLAIN NM, PVT	2360		Approximately 300 plants observed in NW polygon and approximately 100 plants observed in SE polygon in 2011.
63	San Luis Obispo	Wells Ranch	30/03/2011	Carrizo Plain, about 1.6 air miles ENE of Wells Ranch and ~2.7 miles SW of BM 2037, along *Agave* wash.	PVT	2260		Approximately 300 plants observed in 2011.
64	San Luis Obispo	Wells Ranch	20/05/2011	Carrizo Plain, about 3 air miles WNW of Le Traver Ranch, near *Agave* wash and Soda Lake Road.	PVT, BLM-CARRIZO PLAIN NM	2200	Vicinity is used for cattle grazing.	Approximate population sizes observed in 2011 in polygons going from the west to the east: 150, 120, (not provided), 400, and 270 plants.
65	San Luis Obispo	Wells Ranch	30/03/2011	Carrizo Plain, just north of Kern County Land Company Ranch, just east of the Caliente Range.	BLM-CARRIZO PLAIN NM	2425	May be threatened by competition from exotics.	0.2% cover of *Eremalche kernensis* over a 1 to 5 acre stand was observed in the eastern polygon in 2010. Approximately 300 plants were observed in the western polygon in 2011.
66	San Luis Obispo	Wells Ranch	04/04/2008	Carrizo Plain; about 0.75 air mile WNW of Kern County Land Co Ranch, just east of the Caliente Range.	BLM-CARRIZO PLAIN NM	2450	Close to, and visible from, an informal hiking/bicycling trail going up the canyon.	500+ plants observed in 2008.
67	San Luis Obispo	Wells Ranch	20/05/2011	Carrizo Plain, about 1.9 air miles east of Washburn Ranch, just east of the Caliente Range.	BLM-CARRIZO PLAIN NM	2100	Site is used for cattle grazing.	Approximately 500 plants observed in 2011.
68	Kern	Mouth of Kern	04/05/1993	South of Buena Vista Lakebed; approx 1 air mile SSE of Richfield Oil Pumping Station, just east of Buena Vista Hills.	BLM	330		200 plants observed in 1993.
69	Kern	Mouth of Kern	09/05/1993	North of Buena Vista Lakebed; north side of Highway 119 approximately 1 air mile south of BM "plateau tank," Elk Hills.	DOD	500		Fewer than 10 plants observed in 1993.
70	Kern	Taft	09/05/1993	Approximately 2 air miles west of the Naval Petroleum Reserve no 1 southern boundary and Highway 119, Elk Hills.	DOD	690		Fewer than 50 plants observed in 1993.
71	San Luis Obispo	Panorama Hills	06/04/2011	2.9 air miles WSW of Midway Peak, along Elkhorn Road, at NW end of Elkhorn Plain, SW side of Temblor Range.	BLM-CARRIZO PLAIN NM	2355	Vicinity is used for cattle grazing.	10 plants observed in 2011. A 1986 Keil et al. Collection from "5.3 miles SE of Crocker Grade Road on Elkhorn Road in the SW 1/4 of section 7" is also attributed here but may actually be from slightly south of the 2011 De Vries coordinates.
72	San Luis Obispo	Panorama Hills	11/04/2011	At hairpin turn along Crocker Road, 0.7 road mile south of summit of road, Temblor Range, Carrizo Plain NM.	BLM-CARRIZO PLAIN NM	2900	Vicinity is used for cattle grazing.	0.2% *E. kernensis* cover observed within a <1 acre area in 2008. Approximately 3000 plants observed in 2011, but population may have been a mix of *E. kernensis* and *E.*

EO	County	Quad	Date (D/M/Y)	Location	Land Manager	Elev (ft)	Threats	General Comments
								parryi ssp. *parryi*.
73	Kern	Stevens	05/04/1994	Approximately 1.4 air miles ESE of the junction of Stockdale Hwy and Highway 43, south of Calders Corner.	PVT	335	Oil exploration, agriculture, highway construction.	Approximately 50 plants observed in 1994.
74	Kern	Stevens	20/03/2008	Near Calders Corner; Rio Bravo spreading basins S of Rosedale Hwy and ~1000 feet east of Enos Lane, City of Bakersfield.	UNK	330		Site based on two 2008 De Vries collections.
75	Kern	East Elk Hills	28/03/1992	Approx 2.5 air miles ESE of Elk Hills-Buttonwillow Airfield; north side of California Aqueduct, south of Buttonwillow.	UNK	300	Aqueduct right-of-way maintenance and over-grazing.	Hundreds of plants observed in 1992, mostly adjacent to right-of-way.
76	Kern	Reward	31/07/1991	Approximately 1.5 air miles west of McKittrick, McKittrick Oil Field.	PVT	1450	Population relatively undisturbed except for dirt roads at top of slope.	2500 plants observed in 1991.
77	Kern	McKittrick Summit	28/04/1991	Highway 58 about 10 miles west of McKittrick, NE of Soda Lake.	UNK	2700		Site based on 2 vague collections from 1973 and 1991. Needs fieldwork.
78	San Luis Obispo	Simmler	01/04/1934	Near Simmler, Carrizo Plain.	UNK			Only source of information for this site is a 1934 Schreiber collection. Needs fieldwork.
79	Kern | San Luis Obispo	McKittrick Summit	03/04/2005	Wallace Creek, Carrizo Plain.	UNK	2500		Greater than 1 plant observed in 2005. Need map detail for this site.
80	San Luis Obispo	Panorama Hills	06/04/2011	Elkhorn Plain, east of Panorama Point and south of Crocker Grade, on SW side of Temblor Range.	PVT	2435	Vicinity is used for cattle grazing.	Approximately 200 plants observed in 2011.
81	Kern	West Elk Hills	30/05/1986	Approximately 1 air mile NE of McKittrick, north side of the Elk Hills.	PVT	1030		A single flowering plant was observed in 1986.
82	Kern	Lokern	31/03/2004	Near the point where 7th Standard Road crosses the California Aqueduct, about 9 air miles WNW of Buttonwillow.	PVT, BLM, INYO COUNTY, STATE	300	Threats include grazing, agriculture, development, and aqueduct maintenance.	Collected in sec 28 in 1937. Plants were common in w half of section 33 in 1988. Approx 5000 plants in 1989 in southern central polygon. Hundreds of plants seen in 1992 along aqueduct right-of-way. Unknown number in 2004 in far SW polygon.
83	Kern	West Elk Hills	31/03/2004	2.6 air miles SW of the point where Lokern Road crosses the California Aqueduct, about 7 miles west of Buttonwillow.	PVT	475		Over 50,000 plants were observed in 2004 between this occurrence and occurrences #1, 28, 47, 48, and 82 combined.
84	San Luis Obispo	Panorama Hills	30/03/2009	Along Hurricane-Crocker Spring Road, about halfway between Elkhorn plain and the road summit, Temblor Range.	BLM-CARRIZO PLAIN NM	2650		Main source of information for this occurrence is a 2009 collection by Simpson & Simpson. A 1986 collection by Keil et al. From "1.15 mi NE of Jct of Elkhorn Rd on Crocker Grade Road, in SE corner of Section 22" is also attributed here.

EO	County	Quad	Date (D/M/Y)	Location	Land Manager	Elev (ft)	Threats	General Comments
85	Ventura	Cuyama Peak	24/04/2012	2.2 air miles ESE of Ballinger Campground, in Ballinger Canyon, western San Emigdio Mountains.	USFS-LOS PADRES NF	3550	Threatened by ORVs.	Approximately 70 plants observed in 2012.
86	Ventura	Cuyama Peak	03/05/2012	2.8 air miles ESE of Ballinger Campground, in Ballinger Canyon, western San Emigdio Mountains.	USFS-LOS PADRES NF	3700	Threatened by ORVs.	Approximately 30 plants observed in 2012.
87	Ventura	Ballinger Canyon	03/05/2012	1.4-1.8 air miles east of Ballinger Campground, in Ballinger Canyon, western San Emigdio Mountains.	USFS-LOS PADRES NF	3400	Threatened by ORVs.	Approximate population sizes observed in 2012, going from the northernmost to southernmost polygons: 50, 10, 10, and 70 plants.
88	San Luis Obispo	Cuyama	30/03/2011	Along pipeline road, 2.5 air miles east of Quail Canyon, near SE end of Caliente Range.	BLM-CARRIZO PLAIN NM	2960		Approximately 30 plants observed in 2011.
89	San Luis Obispo	Elkhorn Hills	28/03/2011	1 mile SW of Le Traver Ranch buildings, southern Carrizo Plain.	PVT, BLM-CARRIZO PLAIN NM	2350		Approximately 60 plants observed in 2011.
90	San Luis Obispo	Elkhorn Hills	07/04/2011	1.4 mile south of Le Traver ranch buildings, just above the southern portion of Carrizo Plain.	BLM-CARRIZO PLAIN NM	2500	Vicinity is used for cattle grazing.	Approximately 700 plants observed in nw polygon and approximately 1500 observed in se polygon in 2012.
91	San Luis Obispo	Elkhorn Hills	07/04/2011	1.8 miles south of Le Traver Ranch buildings, in foothills on the NE side of Caliente Range.	PVT	2550		Approximately 60 plants observed in 2011.
92	San Luis Obispo	Elkhorn Hills	31/03/2011	1.6 air miles east of Hanline Ranch buildings, along Quail Springs Road, in foothills on NE side of Caliente Range.	BLM-CARRIZO PLAIN NM	3050	Vicinity is used for cattle grazing.	20 plants observed in 2011.
93	San Luis Obispo	Wells Ranch	28/03/2011	1.4 air miles west of Le Traver Ranch buildings, southern Carrizo Plain.	BLM-CARRIZO PLAIN NM	2250		Approximately 100 plants observed in 2011.
94	San Luis Obispo	Wells Ranch	18/03/2011	1.8 air miles west of Le Traver Ranch buildings, southern Carrizo Plain.	PVT	2300		Approximately 400 plants observed in 2011.
95	San Luis Obispo	Wells Ranch	16/03/2011	1.7 air miles SW of Le Traver Ranch buildings, foothills on NE side of Caliente Range.	PVT	2630		Approximately 750 plants observed in 2011.
96	San Luis Obispo	Caliente Mtn.	16/04/1968	Chalk Mountain, north side of Cuyama Valley.	UNK			Only source of information for this occurrence is a 1968 collection by Hoover.
97	San Luis Obispo	Taylor Canyon	18/05/2012	Along Taylor Road and Ridgeline SE of Taylor Road, about 0.8 mile NE of Highway 166, NE of Cuyama Valley.	DFG-CARRIZO PLAINS ER	1990	Possibly threatened by fire.	30 plants observed in NW polygon and 48 observed in SE polygon in 2012.
98	San Luis Obispo	Panorama Hills	11/04/2011	About 2.5 air miles NW of Crocker Road, foothills on SW side of Temblor Range, NE of Elkhorn Plain.	BLM-CARRIZO PLAIN NM	2650	Area is used for cattle grazing.	Approximately 1000 plants observed in 2011.
99	San Luis Obispo	Panorama Hills	14/04/2011	About 1 air mile NE of Panorama Point, in foothills on SW side of Temblor Range.	BLM-CARRIZO PLAIN NM	2550	Area is used for cattle grazing.	Approximately 210 plants observed in western polygon and 250 observed in eastern polygon in 2011.
100	San Luis Obispo	Panorama Hills	14/04/2011	1.4 air miles east of Panorama Point, 1/4 mile NE of Elkhorn Road, Temblor Range.	PVT	2600	Area is used for cattle grazing.	Approximately 50 plants observed in 2011.

EO	County	Quad	Date (D/M/Y)	Location	Land Manager	Elev (ft)	Threats	General Comments
101	San Luis Obispo	Chiminea s Ranch	02/05/2012	1.8 air miles SW of Saucito Ranch buildings, northern Caliente Range.	DFG-CARRIZO PLAINS ER	2950	Area is used for cattle grazing.	40 plants observed in 2012.
102	Kern	Tupman	29/03/1950	1.0 mile west of Kern River Bridge, Highway 399 between Bakersfield and Taft.	UNK	600		Only source of information for this occurrence is a 1950 collection by Balls and Lenz. Elevation on collection label of 600 feet is higher than elevation in mapped area (~300 feet). Needs fieldwork.
103	San Luis Obispo	McKittric k Summit	05/04/2011	Along Elkhorn Road, 1.6 road miles south of Highway 58, NE side of Carrizo Plain.	PVT	2250		Approximately 500 plants observed in 2011.
104	San Luis Obispo	McKittric k Summit	11/04/2011	Along Elkhorn Road, 2.3 road miles south of Highway 58, NE side of Carrizo Plain.	PVT	2300	Area is used for cattle grazing.	Approximately 50 plants observed in SW polygon and 10 observed in NE polygon in 2011.
105	San Luis Obispo	Camatta Ranch	13/04/1985	Adjacent to Shell Creek Road, ca. 1 mile north of junction with ca Highway 58, northern La Panza Range.	UNK	1350		Only source of information for this occurrence is a 1985 collection by Riggins.
106	San Luis Obispo	Packwood Creek	20/04/2001	Along Bitterwater Road, circa 10 miles north of junction with Highway 58, Bitterwater Canyon, Temblor Range.	UNK	2200		Only source of information for this occurrence is a 2001 collection by Keil & Keil.
107 *	Ventura	Cuyama Peak	04/05/2011	Mount Pinos region Quatal Canyon, south off Forest Service Road 9N09, east of Highway 33 and the upper Cuyama Valley.		3360	USFS – Los Padres NF	Broad river wash, with upper sandy benches. Flowers size fits into ssp. kernensis, but did not see many plants, and all that I seen were bisexual flowers. All lavender color. Flowering
108 *	Ventura		06/05/1958	Apache Cyn near Hwy 399				
109 *	Ventura		29/04/1957	Near Ozena				under shrubs over side area on open valley floor
110 *	Ventura		05/06/1963	Cuyama River near Hwy 399 between Apache Cyn and Brubaker Cyn		3500		Sandy flats
111 *	Ventura		03/05/2012	Ballinger Cyn, ca. 0.4 km SW of Pk 3875 of cmpgrd, ca. 0.9 km ESE of PK 3826, ca. 3.5 km ESE of cmpgrd		3540	USFS-Los Padres NF	sandy to gravelly soil; S-facing slope
112 *	Ventura		03/05/2012	E-W ridge top just S of lateral branch of Ballinger Cyn, ca. 2.9 km E of cmpgrd, ca. 0.8 km SSE of PK 3588, ca. 0.6 km NNE of PK 3826		3400	USFS-Los Padres NF	sandy to gravelly soil; S-facing slope
113 *	Ventura		03/05/2012	Ballinger Cyn, ca. 2.2 km E of cmpgrd, ca. 0.6 km SW of PK 3588, ca. 0.8 km NW of PK 3826		3360	USFS-Los Padres NF	sandy to gravelly soil; S-facing slope
114 *	Ventura		19/04/1998	Vicinity of Ballinger Cyn Cmpgrd		3200	USFS-Los Padres NF	sandy loam; full sun; pinyon juniper woodland
115 *	Ventura		14/04/1996	Ballinger Cyn, hills N of cmpgrd		3700	USFS-Los Padres NF	arid clay loam; full sun; E-facing slope;
116 *	Ventura		20/04/1957	Cuyama Valley near Ozena				On open valley floor; Common under shrubs over wide area

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Eryngium aristulatum var. parishii (J. M. Coult. & Rose) Mathias & Constance (San Diego button-celery)

Known ☒ Potential ☐

Table 1. Management Status by government and private agencies (CNDDB 2013, CNPS 2013)

Federal Listing Status	Proposed or Designated Critical Habitat	Recovery Plan	State Listing Status	Heritage Rank	California Rare Plant Rank	Other Lists
FE	No	Yes	CE	G5T1/S1	1B.1	

Plant Description: *Eryngium aristulatum* var. *parishii* (Fig.1) is a tap-rooted biennial or a longer-lived perennial that typically flowers between April-June. The glabrous stems, measuring 1-9 dm, are erect and spreading and branch 2-5 cm distal to rosette. The petiolate leaf is 8-10 cm in length. The lanceolate-oblanceolate leaf blade, 3-5 cm long, is pinnately lobed and can occasionally have sharp coarse serrations. Inflorescences are generally cymes of spherical heads that measure 5-9 mm, with a 0.5-1.5 cm long peduncle. Bracts measure 1-3 cm in length. The outer bract margins form spines in 0-3 pairs while inner bracts spines are lacking. Calyx lobes, ranging in length from 1.7-2.8 mm are entire, lanceolate to ovate, and have a spine tip < 1 mm. The white petals are oblanceolate. The style measures ca. 1.5-3.5 mm and is occasionally purple. The obovate fruits measure 2 mm and have persistent styles that equal that of the calyx in length. Fruit scales are awl-like or ovate (Preston et al. 2012).

Figure 1. *Eryngium aristulatum* var. *parishii*. Photo Credit: Aaron Arthur 2013: CalPhotos

Taxonomy: *Eryngium aristulatum* var. *parishii* is a member of Apiaceae (carrot family). There are three varieties of *Eryngium aristulatum*: *E. aristulatum* var. *aristulatum*, *E. aristulatum* var. *hooveri*, and *E. aristulatum* var. *parishii* (Preston et al. 2012). This taxon was originally described as a species (*Eryngium parishii*) by Coulter and Rose (1900). Jepson (1922) later considered the taxon as a variety of *E. jepsonii* (var. *parishii*). Mathias and Constance (1941) revised the group and published the current accepted name *Eryngium aristulatum* var. *parishii*.

Identification: *Eryngium aristulatum* var. *parishii* can be distinguished from *E. aristulatum* var. *aristulatum* by having styles persistent in fruit that are about the same length as the calyx. The later variety has styles that are much shorter than the calyx. In addition, it is distinguishable from *E. aristulatum* var. *hooveri* by having inner bracts without spiny margins (Preston et al. 2012). It is also important to note that a few populations previously identified as *E. aristulatum* var. *parishii* were described as a new species, *E. pendletonense* (Marsden and Simpson 1999). *Eryngium aristulatum* var. *parishii* is distinguished from *E. pendletonense* by a combination of leaf and flower characteristics, an erect habit and habitat type. *Eryngium pendletonense* is known to occur in coastal sage brush, grasslands, and coastal bluffs rather than vernal pools.

General Distribution: *Eryngium aristulatum* var. *parishii* currently occurs in 14 geographic areas in Riverside and San Diego Counties (USFWS 2010). Herbarium vouchers of *E. aristulatum* var. *parishii* documented occurrences in six areas of Riverside County at the time of listing; however, there are now only four sites on the Santa Rosa Plateau (Western Riverside County MSHCP 2003). There are three EOs from Riverside County in the CNDDB: 7, 62, 66 (Table 2). This taxon is primarily distributed in ten regional locations in San Diego County including MCB Camp Pendleton, Carlsbad, San Marcos, Ramona, Del Mar Mesa, Carmel Mountain, Mira Mesa, MCAS Miramar, Otay Lakes, and Otay Mesa (USFWS 2010). Elevation

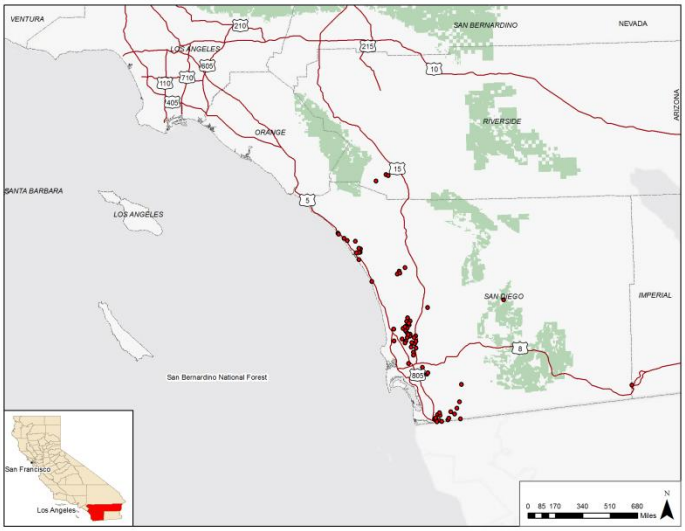

Figure 2: Distribution of the *Eryngium aristulatum* var. *parishii* in California

typically ranges from 50-650 ft. However some populations particular those from Santa Rosa Plateau as well as EO 108 from Cleveland National Forest in San Diego County can range from 920-2887 ft (CCH 2011, CNPS 2013, USFWS2010).

Distribution in R5: According to the CNDDB (2013), EO#108 is known to occur on USFS land in the Cleveland National Forest (see Figure 2 and Table 2). This occurrence is just NW of Kessler Flat just south of Eagle Peak Road. However, this population is not within the typical distribution or elevation range for *Eryngium aristulatum* var. *parishii* (See General Comments for EO#108 in Table 2) and requires further study.

Habitat Description: *Eryngium aristulatum* var. *parishii* is a vernal pool obligate occurring on clay and surface or non-surface hard pan substrates. Plants rely on ephemerally wet conditions for successful reproduction. This variety particularly favors seasonally inundated areas of vernal pools which often dry after spring inundation until the following year (or longer during drought cycles), often suggesting xeric playas or otherwise open and degraded landscapes (CCH 2011, CNPS 2013, USFWS 2010).

Associated species: *Adenostoma fasciculatum*, *Alopecurus* sp., *Avena barbata*, *Brodiaea filifolia*, *Deinandra fasciculata*, *Deschampsia danthonioides* var. *gracilis*, *Downingia cuspidata*, *Eleocharis macrostachya*, *Erodium cicutarium*, *Eryngium arstulatum*, *Festuca* sp., *Hemizonia* sp., *Lamarckia aurea*, *Lasthenia chrysostoma*, *Lythrum hyssopifolia*, *Malvella leprosa*, *Nassella cernua*, *Navarretia fossalis*, *N. prostrata*, *Orcuttia californica*, *Plagiobothrys leptocladus*, *P. undulates*, *Pogogyne abramsii*, *P. nudiuscula*, *Psilocarphus* sp., *Ranunculus californica*, *Rumex* sp., *Sisyrinchium bellum*, *Stipa pulchra*, *Trifolium variegatum*, and *Xanthium strumarium* (CCH 2011, CNDDB 2013).

Occurrence status and population trends: *Eryngium aristulatum* var. *parishii* can be locally abundant in remnant vernal pools; however, the distribution of this taxon has been dramatically reduced due to loss of most (95 to 97 percent) of the vernal pool habitat in San Diego County (USFWS 2010). Most population trends are not current. However, some data are available from the 2003 vernal pool survey by the City of San Diego. Of the surveyed 69 sites within their jurisdiction, 28 contained *Eryngium aristulatum* var. *parishii*. In total, the taxon was found on 8.1 of 14.5 ha (20 of 36 ac) of basin habitat (City of San Diego 2004). Survey data at MCAS Miramar concluded that the taxon was found in 20 of 45 vernal pool complexes on the installation (Black 2004; Black 2007). According to the CNDDB (2013), the following EOs are considered extirpated: 39, 40, 42, 44, 73, 96, 104 (all have been attributed to development in San Diego County); while the following EOs are possibly extirpated: 3, 4, 6, 20 (all San Diego County). Populations trends are not known for the EO on USFS land in the Cleveland National Forest.

Threats or other information: Vernal pool habitat loss due to development, specifically in coastal areas of southern California is the primary threat to occurrences of *Eryngium aristulatum* var. *parishii* (including preserves (e.g., Santa Rosa Plateau) or on conserved lands). Road development, OHV use and related construction activities are all contributors to habitat loss (USFWS 2010). Watershed alterations near vernal pool habitat have caused changes in the hydrological structure and function of some vernal pool habitats. While still a threat throughout the range of the variety, impacts of hydrological alterations have decreased in some areas due to development standards that control run-off and water use (USFWS 2010). Military activities have also continued to impact *Eryngium aristulatum* var. *parishii'*s habitat. However, much vernal pool habitat has been restored through cooperation with MCAS Miramar and MCB Camp Pendleton via provisions in the INRMPs. Insect herbivory is a potential threat to the taxon (USFWS 1993; USFWS 1998) which can have considerable effects on plant population dynamics especially in the presence of native and nonnative competitors (Louda 1994). In addition, small population size has potential to affect genetic continuity and maintenance of remnant populations. Fire and fire suppression activities are the most hazardous stochastic risk to the species, with increasing wildfire size and intensity represented in the WUI that can impact vernal pool ecosystems. Finally, it has been reported that extended drought and climate change are potential threats to all vernal pool taxa; threats may decrease the long term viability of small to medium-sized vernal pools through loss of rainfall (USFWS 2010).

Table 2. Occurrences of *Eryngium aristulatum* var. *parishii*. The EO numbers correspond with labeled locations in Figure 2. (CNDDB 2012). (ACEC=Area of Critical Environmental Concern; BLM=Bureau of Land Management; DOD=Department of Defense; DPR=Department of Parks and Recreation; NF=National Forest; OHV=Off-Highway Vehicles; PVT=Private, SP=State Park, UNK= unknown and USFS= U.S. Forest Service).

EO	County	Quad	Date (D/M/Y)	Location	Land Manager	Elev (ft)	Threats	General Comments
1	San Diego	Otay Mesa	2003	Otay Mesa, South of Siempre Viva Rd and West Of La Media Road, just N of The CA/MX border.	PVT	465	Agriculture. Some pools were overgrown with *Lolium*.	Observed in Beauchamp pool complexes j19-21 in 1979. Plants were not observed in 1986 or 2003.
3	San Diego	San Luis Rey	16/06/1897	Oceanside.	UNK	50		Type locality. Only source of information for this site is an 1897 collection by Parish. Occurrence is probably extirpated.
4	San Diego	San Marcos	16/09/2009	1 Mile North Of San Marcos. Exact location unknown. About 1 Mi N of San Marcos in vicinity of Twin Oaks Valley Rd.	UNK	620	Development. Grazing and trampling may also have eliminated any historic pools that were once present.	Only source of information for this site is a 1937 Gander collection. Roberts searched area in 2009 for *Navarretia fossalis* (collected by Gander on same day as *Eryngium*); 95% of the habitat in this area has been developed.
5	Imperial | San Diego	In-ko-pah Gorge	xx/04/1917	Mountain Springs Grade.Exact location unknown..	UNK			Only source of information for this site is a 1917 Orcutt collection. Needs fieldwork.
6	San Diego	La Mesa	03/05/1936	Near 50th St and Adams Ave., E of San Diego.	PVT	400	Much development has occurred in this area since 1936;likely extirpated.	Main source of information for this site is a 1936 Gander collection. A 1936 Purer collection from "College Park" attributed to this occurrence.
7	Riverside	Wildomar	13/05/2005	Mesa De Colorado, Santa Rosa Plateau, W of Temecula.	DFG-SANTA ROSA PLATEAU ER	2060	Area is subject to increasing rural residential development (1990). Changes in vernal pool hydrology may also threaten.	Fewer than 1000 plants in 1981. Pool and grassland burned in 1988 which removed heavy mulch layer in pool. 12,000 plants seen in 1990. Locally abundant in 2005. Includes former occurrences #8, 63 & 67.
9	San Diego	Otay Mesa	22/06/2012	Otay Mesa, between Brown Field Municipal Airport and Donovan State Prison, S of Otay River, San Ysidro.	USFWS, SDG COUNTY, PVT, OTHERS	520	Cattle trampling/grazing, weeds, water runoff, orvs. May be impacted by weeding/grading for habitat creation.	Observed in j23, j24, j29-31 pools in 1979. Common in 10-50% of j23, j24, j29 & j30 pools in 1986. Plants in 168 basins across site in 1990. Obs in 43 basins in 2003. Obs in sec 23 in 2005. 1000 plants in sec 27 in 2012. Incl former eo #13.
10	San Diego	Otay Mesa	04/06/2005	Otay Mesa; Approximately 0.6 Mile S Of Lower Otay Camping Area, North Of O'neal Cyn, E of Chula Vista. NW of prisons.	PVT	510	Vehicle tracks in pools and some mounds removed; otherwise relatively undisturbed. Site bisected by road.	Observed in the j26 pools in 1979. Common in 3 pools and uncommon in a 4th pool in 1986. 50-100 plants seen in 1 pool in 1990; habitat described as extant and relatively undisturbed. Considered "scarce" in 2005.
11	San Diego	Otay Mesa	2008	Just North of Bushalaugh Cove, Lower Otay Reservoir, East of Chula Vista.	CITY OF SAN DIEGO	550	Area has been impacted by grazing (2003).	Observed in k3-k5 pools in 1979. "abundant" in 10-50% of the k3-k5 pools and "common" in less than 10% of the k3-k5 pools in 1986. Observed in eastern portion of site (k5 pools) in 1990. Observed in ~46 basins in 2003. 100 plants in 2008.
12	San Diego	Otay Mesa	07/09/1990	Otay Mesa; "Rattlesnake Hill," South of Johnson Canyon, 0.7 km (0.5 mi)	PVT	620	Much of vernal pool habitat has been filled in	Found in this pool complex by Beauchamp in 1979. Uncommon in 2 pools in 1986.

EO	County	Quad	Date (D/M/Y)	Location	Land Manager	Elev (ft)	Threats	General Comments
				South of Brown Field Bombing Range.			except for outer edges where *Eryngium* occurs (1990).	20-40 plants seen in 1990. Habitat considered extant but highly degraded in 1990.
14	San Diego	La Mesa	25/03/2005	Near the junction of 1-15 and Hwy 52, Marine Corps Air Station Miramar, San Diego.	DOD-MCAS MIRAMAR	400	Low to medium disturbance from ORV damage and brushing. Site bisected by Hwy 52. Portions may be developed.	Observed in Beauchamp pools aa3-7 in 1979 (*Eryngium* may not have been present in all pools). Common in 10-50% of aa3 pools in 1986 (n of hwy 52), not seen in aa4-7 pools in 1986. Far nw poly: small numbers of *Eryngium* in 9 pools in 2005.
15	San Diego	La Mesa	1979	Kearny Mesa; Approx 0.3 air mi SW of junction of San Clemente Cyn Rd and Kearny Villa Rd	DOD-MCAS MIRAMAR	460		*E. a*. var. *parishii* reported from a single pool in group rr1 in 1979 recon report.
17	San Diego	La Mesa	20/07/1982	East Miramar Air Station; just S Of San Clemente Canyon on SE side of Kearny Villa Road/Vegas Drive Junction, San Diego.	DOD-MCAS MIRAMAR	490		Observed in 6 pools at this site by recon in 1979. Observed in 9 pools in 1982 (surveys conducted between April 22 and July 20, 1982).
20	San Diego	La Jolla	07/04/1986	Mission Valley; approximately 0.4 air mile NNE of the Junction of Mission Center Road and Friars Road, San Diego.	PVT	250	Heavily disturbed pools. Area adjacent to gravel pit & development. Site may be extirpated based on 2012 aerial imagery.	Observed in 7 pools in 1979. Common in over 50% of the pools in 1986. Old collections from "Mission Valley" are also attributed to this site. Includes former occurrence #2.
21	San Diego	La Jolla	19/05/1994	Marine Corps Air Station Miramar; between west end of runways and Rose Canyon, San Diego.	DOD-MCAS MIRAMAR	425	Earth moving and runway construction have altered water regime.	Common in over 50% of pools in 1986.
23	San Diego	La Mesa	05/03/2003	Kearny Mesa; between runways and San Clemente Canyon, southern part of Marine Corps Air Station Miramar, San Diego.	DOD-MCAS MIRAMAR	440	Exotic annuals, near landfill & gravel mining operations, mowing, dirt roads, military activities, altered water regime.	Access to some sites is difficult. Observed across occurrence in 1979, 1982, and 1986. Observed in small portions of site in 2001 and 2003. Includes former occurrence #s 18, 22, 24, 29, 32, & 84.
25	San Diego	La Mesa	15/09/2011	Kearny Mesa; between Convoy St And Ruffin Rd/Kearny Villa Rd, About 0.7 mi both N and S of Hwy 52, San Diego	DOD-MCAS MIRAMAR, PVT	430	ORVs, brushing, water impoundment, dumping, adj to landfill, non-natives. Portions destroyed by development & highway.	Observed across site in 1979 & 1982. Portions of site destroyed by development by 1986; eryngium was abundant to common in the remaining pools in 1986. 5000+ in portion of site in 2011. Includes former occurrences #26-28, 81-82.
30	San Diego	Poway	1980	East Marine Corps Air Station Miramar; Approximately 0.3 air mile SSE of junction of I-15 and Miramar Road, San Diego.	DOD-MCAS MIRAMAR	500	Highway realignment; site previously on east side of I-15, now on west side.	Observed in beauchamp's aa i pools in 1979. No plants reported in recon's 1979 survey of this area. No plants observed in 1980.
33	San Diego	La Jolla	25/03/2005	Both sides of Miramar Rd. about 0.4 To 1.4 mi E Of I-805, N Of Rose Cyn., SD.	DOD-MCAS MIRAMAR, PVT	400	Medium to high disturbance of pools. ORVs, dumping,	Observed across site in 1979. Portion of site extirpated by 1986; *Eryngium* was uncommon to abundant in

EO	County	Quad	Date (D/M/Y)	Location	Land Manager	Elev (ft)	Threats	General Comments
							grading, brushing, roads, irrigation runoff, development.	remaining pools in 1986. 10,000s of plants observed in 232 pools in 2005 (map detail not provided). Includes former occurrences #36 & 83.
34	San Diego	Del Mar	01/02/2005	Along East Ocean Air Dr., between Carmel Mountain Rd and Corte Jardin Del Mar, NE of Soledad Valley, San Diego.	PVT	380	Portions may have been extirpated by development; remaining habitat surrounded by development.	Observed in Beauchamp pools h31-33 in 1979. Eryngium uncommon in 10-50% of the pools in 1981 & 1985. Only one extant basin observed in area in 2003; no plants present. Observed in 7 pools in 2 n polygons in 2005. Includes former occ #35.
37	San Diego	Del Mar	12/06/2009	Del Mar Mesa area; NW of Penasquitos Ranch between Los Penasquitos Canyon and Deer Canyon, San Diego.	DFG, CITY OF SDG, PVT, OTHERS	430	Portions of occurrence extirpated by development. Non-native species, illegal dumping, ORVs, and roads are also threats.	Observed in Beauchamp h series pools in 1979. Pools at NE & S ends of occ destroyed by residential development by 1986; plants abundant in remaining pools in 1986. Observed in 2003 and 2004. 150,000+ in 2009. Includes former eos #38 & 95.
39	San Diego	Del Mar	17/04/1986	Lopez Mesa; S side of Penasquitos Canyon, Approximately 1.3 Air Miles NW of Mira Mesa, San Diego.	PVT	410	Site has been extirpated by development.	Observed in Beauchamp's b9 pools in 1979. Site destroyed by development by 1986.
40	San Diego	Del Mar	17/04/1986	Lopez Mesa; south side pf Penasquitos Canyon, ~1.1 air miles N of Mira Mesa at north end of Camino Ruiz, San Diego.	PVT	430	2012 aerial imagery shows occurrence was extirpated by development.	Observed in Beauchamp's b12 and b13 pools in 1979. In 1986, common to uncommon in <10% of western pools; not seen in eastern pools. Includes former occurrence #86. Site has since been extirpated by development.
42	San Diego	Del Mar	17/04/1986	East end of Canyon Point Lane, West Of Montongo Street, approximately 0.7 air mile NW of Mira Mesa, San Diego.	PVT	425	Site extirpated by development.	In 1 pool of 50 sq meter area in 1979. Site inaccessible in 1986; appeared to have been destroyed by development.
43	San Diego	Del Mar	03/05/2004	North of Flanders Dr, South of Calle Cristobal, Between Parkdale Ave and Camino Santa Fe, ~1 mile west of Mira Mesa.	PVT, CITY OF SAN DIEGO	415	Development & fragmentation of habitat are the main threats. Also threatened by recreation and grading activities.	Observed throughout occurrence in 1979. Portions extirpated by development in 1986; plants uncommon to abundant in remaining pools in 1986. This occurrence was once extensive; only observed in 7 pools on a 20 acre parcel in 2003 & 2004.
44	San Diego	Del Mar	15/04/1986	Just S of Carroll Canyon; between Miramar Rd and Carroll Canyon Rd, W of Camino Ruiz and E of Dowdy Drive, San Diego.	PVT	440	Extirpated by development.	Observed across this site in 1979. Site extirpated by development by 1986.
45	San Diego	Del Mar	10/04/1986	Between Golf Course and Miramar Road, West of Rigel Road, Marine Corps Air Station Miramar, San Diego.	DOD-MCAS MIRAMAR	440	Highly disturbed area. Surrounded by development, roads, and golf course.	Observed in Beauchamp pool complexes z6 and z7 in 1979. Common in 10-50% of the z6 and z7 pools in 1986.
46	San Diego	Del Mar	15/04/1986	Both sides of Miramar Road and Miramar Memorial Golf Course,	PVT, DOD-MCAS	430	Portions of this site have been extirpated by	Observed in Beauchamp's I and Z series vernal pools in 1979. *Eryngium* common in the

EO	County	Quad	Date (D/M/Y)	Location	Land Manager	Elev (ft)	Threats	General Comments
				between Distribution Ave and Empire St, San Diego.	MIRAMAR		development. Road bisects area.	southern portion of site (z series) on April 10, 1986; 4 northern polygons (I series) extirpated by April 15, 1986. Includes former occurrence #47.
50	San Diego	Del Mar	22/04/2009	Between Camino Ruiz and Parkdale Ave, South of Jade Coast Rd, North side of Carrol Canyon, San Diego.	PVT, CITY OF SAN DIEGO	415	Development has extirpated most pools. Remaining pools are fenced but trash has been noted at site (2003).	Observed across site in 1979. Most pools extirpated by development by 1986; eryngium abundant to common in west portion of site in 1986. Only remaining pools are in west portion of site: eryngium in 65 basins in 2003, observed in 2009.
51	San Diego	San Marcos	14/03/2008	Between San Marcos Blvd and Hwy 78, SE of South Pacific St, SW of Via Vera Cruz, San Marcos. Portions of this site have been extirpated by development.	PVT	530	Industrial development, vehicle tracks, trash in pools, competition from exotics. Road grading influenced hydrology.	Observed in beauchamps l series pools in 1979. Seen in 5 pools in 1986. 250 plants in 1993. 50+ plants in 3 pools in march 2003. Southernmost polygon: 180 plants in june 2003, "several individuals" in 2008. Includes former occurrence #52.
53	San Diego	Las Pulgas Canyon	1987	Camp Pendleton Marine Corps Base; on both sides of I-5 between Las Flores Creek and Aliso Cyn.	DOD-CAMP PENDLETON MCB	75	Damage from tanks and other vehicles.	Observed in 3 pools in 1979. Common in over 50% of the pools in this area in 1985. Observed throughout occurrence in 1987. Includes former occurrences #54, 76, and 77.
55	San Diego	Las Pulgas Canyon	1987	Camp Pendleton; Approximately 1.0 mile N (Along Coast) from Las Flores Creek Lagoon, on SW side of I-5.	DOD-CAMP PENDLETON MCB	90		Observed in a single pool in 1979. Observed in over 50% of the pools in this area in 1985. Observed in several natural-appearing basins in 1987.
56	San Diego	Imperial Beach	10/04/2003	Otay Mesa; W of Dennery Cyn and N Of Otay Mesa Rd, 1.0 to 1.5 mi E of I-805, San Ysidro.	PVT	520	Area heavily used by ORVs. Northern 2 polygons extirpated by development.	Northern two polygons: observed in 1979 and 1986; mistretta unable to relocate site in 1990; based on 2012 aerial imagery area is developed, site extirpated. Southern polygon: eryngium found in a single basin in 2003.
57	San Diego	Imperial Beach	07/09/1990	Otay Mesa; N of Otay Mesa Rd, just W of Corporate Center Drive, E of Dennery Canyon, San Ysidro.	CITY OF SAN DIEGO	500	ORV activity has virtually obliterated the site; remaining depressions contain trash (1990).	Observed in the n polygon (j2 pool) in 1979. Common in area in 1986. S polygon: 80 plants in 1985, 1000 in 1990. Includes former occ #72. Only mapped the natural pools; area has been highly modified with created pools & planted *Eryngium*.
58	San Diego	Imperial Beach	22/09/1990	Otay Mesa, between Dennery Canyon and Avenida De Las Vistas, About 0.6 mi W of Otay Valley Road, San Ysidro.	PVT, CITY OF SAN DIEGO	430	Dirt road crosses area providing access for ORV activity (1986). Part of site (west polygon) extirpated by development.	E polygon: observed in 1979 (Beauchamp's j5 pool), common in this pool in 1986, pools possibly created at site in subsequent years. <1000 plants observed on edges of man-made vernal pool in area in 1984 & 1985. W poly: ~1000 plants in 1990.
59	San Diego	Otay Mesa	31/05/2011	Otay Mesa, N of Wruck Canyon extending NW to near head of Dillon Canyon, 0.6 to 1.9 mi W of	PVT, CITY OF SAN DIEGO,	450	Industrial development, grazing, orv use, roads,	Seen in 6 of the J pool complexes in 1979. Common in 1986. 600+ plants in 5 pools in 1990. Abundant at e end in

EO	County	Quad	Date (D/M/Y)	Location	Land Manager	Elev (ft)	Threats	General Comments
				Cactus Rd, San Ysidro	OTHERS		border traffic, and competition from invasive grasses.	1995. Seen in 14 pools in 2003. E part of site: 450 in 2008, 850 in 2009, unk # in 2011. Includes former EO #60, 70, 71, 89.
61	San Diego	Otay Mesa	06/2006	Otay Mesa near Border, S of Wruck Canyon, W of the west end of Calle De Linea, San Ysidro.	PVT	480	In 1986, motorcycle, heavy border traffic, trampling were threats. Evidence of fire & trash in 1990. ORVs in 2003.	West end of site: observed in 1979, uncommon in 1986, 200 plants in 3 pools in 1990. Unknown number of plants observed in 2000. Remainder of site contains created pools: observed in 16 basins in 2003 and throughout site in 2004-2006.
62	Riverside	Murrieta	14/05/2009	North end of Mesa De Burro, Santa Rosa Plateau Ecological Reserve, SW of Murrieta.Mesa De Burro Pools B-1, B-2, & B-3.	DFG-SANTA ROSA PLATEAU ER	2000		More than 1000 plants seen in 1985 in 3 pools. Observed in the same three pools in 1986, 1988, and 1990. Observed by menuz in "a series of 4 vernal pools" in 2009.
64	San Diego	San Luis Rey	1987	Wire Mountain, above head of Tuley Canyon, 0.25 mi N of north end of Dogwood Rd, Camp Pendleton Marine Corps Base.	DOD-CAMP PENDLETON MCB	300	Military housing project proposed for area as of 1983.	About 250 plants in 1983. Observed in a single pool in 1987.
65	San Diego	San Marcos	1991	San Marcos; just W and SW of Palomar College.	PVT	560	Site is cleared annually for fire safety. Area surrounded by development.	Observed in the southern polygon sometime in the early 1980s. Observed in both polygons in 1991. Includes former occurrence #90.
66	Riverside	Murrieta	18/05/2005	Mesa De Burro; Near head of Miller Canyon & about 0.5 mile to W, Santa Rosa Plateau Ecological Reserve, SW of Murrieta. In Mesa De Burro Pools B6, B8, and in swale just SW of pool B8.	DFG-SANTA ROSA PLATEAU ER	1970	Some non-native species in swale and adjacent grassland.	Portions of occurrence monitored by tnc in 1986 and 1988. 373 plants observed by gorden-reedy in 1990 in a moist swale on mesa de burro. Observed in 2003. "locally abundant" in drying vernal pools in 2005. Includes former occurrence #85.
68	San Diego	National City	12/02/1985	Chollas Park; S of Chollas Reservoir Spillway and N of Ryan Rd, San Diego.	CITY OF SAN DIEGO	450	Eucalyptus grove and suburbs nearby; area is a city park. Heavy rabbit grazing may be a threat.	Observed in vernal pools in 1985.
69	San Diego	Imperial Beach	1990	South Rim of Otay Mesa, 0.5 Mile NE of Border Crossing, San Ysidro.	UNKNOWN	350	Illegal aliens, border patrol, burning regime, extensive grazing.	Site represents 2 pools from a series of pools that bauder and griggs (1985) mentioned as having Eryngium; unclear if it occurred in all pools or just a subset of those pools. Site searched for but not found in 1990.
73	San Diego	La Jolla	06/07/1987	Area S of La Jolla Village Dr, N of Nobel Dr, E of Genesse Blvd, and West of Regent Rd, San Diego.	PVT	360	Site completely obliterated by grading and subsequent development.	Common in 10-50% of the x6 pools in 1986. 25+ plants observed in may 1987. Extirpated by development in July 1987. Mitigation was to include purchase of vernal pool habitat off-site.
74	San Diego	Las Pulgas Canyon	1987	Camp Pendleton Marine Corps Base; NE end of Upper Stuart Mesa, near	DOD-CAMP PENDLE	400		Observed in 1987.

EO	County	Quad	Date (D/M/Y)	Location	Land Manager	Elev (ft)	Threats	General Comments
				the intersection of Williams Dr and Macs Rd.	TON MCB			
75	San Diego	Las Pulgas Canyon	1987	Camp Pendleton Marine Corps Base, Approx. 0.6 mi. North (Along Coast) from Las Flores Creek Lagoon, SW of I-5.	DOD-CAMP PENDLETON MCB	50		A few patches of eryngium observed in 1987.
78	San Diego	San Luis Rey	17/03/1987	North end of Wire Mountain, N of Abner Court, E of Vandegrift Blvd, Camp Pendleton Marine Corps Base. In the Ne 1/4 of the NW 1/4 Of Section 11.	DOD-CAMP PENDLETON MCB	250	Expansion of military housing may pose a threat.	480 plants observed in 1987 between this occurrence and occurrence #79.
79	San Diego	San Luis Rey	17/03/1987	SW edge of Wire Mountain, between Alderwood St. and Wire Mtn. Rd, Camp Pendleton Marine Corps Base. Within the north 1/2 of the NE 1/4 of Section 14.	DOD-CAMP PENDLETON MCB	230	Expansion of military housing may pose a threat.	480 plants observed in 1987 between this occurrence and occurrence #78.
80	San Diego	Imperial Beach	1990	West edge of Otay Mesa, 0.7 mi E of San Ysidro Academy, San Ysidro. Along Jeep Trail just S of Moody Canyon	SDG COUNTY	380		50-100 plants seen in 1981. Unable to relocate site in 1990.
87	San Diego	National City	2001	Chollas Heights Naval Radio Station, San Diego. North Side of Zero Rd. Near the center of the NW 1/4 of Section 35.	DOD-NAVY	470	Pools disturbed due to maintenance operations around the radio transmitters. Evidence of disking	Unknown how many plants seen in 1991 by David Zippin and Cameron Patterson as part of military family housing project survey. Observed in this area in 2001.
88	San Diego	Jamul Mountains	06/07/1990	Proctor Valley, 0.3 Mile S of Indian Rock Corral along either side of Proctor Valley Road, SW of Jamul. Three Vernal Pools, two N of the road and one S of it. In the SE 1/4 of the NW 1/4 of Section 17.	DFG-RANCHO JAMULER	920	Development and illegal dumping threaten this popualtion. Area disturbed by cattle tracks, vehicles, and trash.	Dominant in one pool and uncommon in 2 pools at this site in 1990.
91	San Diego	San Marcos	05/1993	Near the intersection of Grand Ave and Linda Vista Dr, San Marcos.	PVT	550	Trespassing. Parcels are completely surrounded by development.	Southern polygon: observed in the l11-l13 pools in 1979, common in over 50% of the pools at this site in 1986, 800 plants in 1993; site never mowed/grubbed for fire safety..
92	San Diego	Encinitas	19/05/1999	Poinsettia Station, along railroad east of south Carlsbad State Beach, Carlsbad. Along east side of tracks. Originally found on two swales, one 40 ft E of the tracks and the other 100 Ft east of the tracks.	PVT	50	Pedestrian and dog traffic; vernal pool surrounded by fence (1999). Area highly developed since 1999.	In 1989, recon estimated 1500 plants in 35 distinct groups/pools. In 1992, a few plants seen in swale 100 feet east of tracks and several hundred seen 40 feet east of tracks. 14 plants observed in 1999.
93	San Diego	San Luis Rey	04/10/1995	Immediately E of the NE intersection of Wire Mountain Road and Ash Road, Camp Pendleton Marine Corps Base.	DOD-CAMP PENDLETON MCB	180	Several pools damaged by ongoing disking. Site proposed for military housing.	More than 20 plants observed in 1995.

EO	County	Quad	Date (D/M/Y)	Location	Land Manager	Elev (ft)	Threats	General Comments
94	San Diego	Del Mar	06/1993	Between Deer Cyn Place and Camino Del Sur, NE of Hwy 56, Northern San Diego.	CITY OF SAN DIEGO	400	Dumping, trespassing, and ORV use. Site surrounded by development.	9 plants observed in 1993. Site quality is poor. Vernal pools created at west end of site in 2001. Plants observed in 3 created/restored pools in 2003.
96	San Diego	Del Mar	05/1986	Near the intersection of Brickellia St and Park Village Rd, North of Los Penasquitos Cyn, Northern San Diego.	PVT	400	Destroyed by residential development.	Seen in 1979 in beauchamp's h29 pool complex. By 1986, site was destroyed by residential development.
97	San Diego	Poway	03/06/1983	North Side of Mira Mesa Blvd, just E of powerline, S of Rancho Bernardo.	UNK	500		Only source of information for this site is 1983 collection by reveal. Needs fieldwork.
98	San Diego	Otay Mesa	26/03/2003	Otay Mesa; West Of Junction of La Media Rd and Airway Rd, about 0.5 Air Mile SSE of Alta School, East Of San Ysidro.	PVT	480	Competition from exotic annual grasses. Portions of site have been developed.	Observed in the j27 and j28 pool complexes in 1979. Southern portion of site (j28 pools): common in 1986, 1 plant in 1990, not observed in 2003. Far ne portion of site (j27 pools): observed in 9 basins in 2003.
99	San Diego	Otay Mesa	2006	SE end of Otay Mesa; Approximately 0.9 air mi SSE of junction of Otay Mesa Rd and Alta Rd, just N of Ca/Mexico Border.	UNK	515		5 plants observed in 2006.
100	San Diego	La Jolla	22/04/2009	General Dynamics; W Of Ruffin Rd, in vacant lot in between Spectrum Center Blvd and Balboa Ave (Hwy 274), San Diego. East end of Property.	PVT	430	Site is completely surrounded by development, but it is fenced for protection	Observed 2 in 2003 and 2004. 2500 plants observed in 2008. 950 plants observed in 2009.
101	San Diego	La Jolla	05/03/2003	SW of runways, W of Vegas Drive, between Rose Canyon & San Clemente Canyon, San Diego.	DOD-MCAS MIRAMAR	430		Unknown number of plants observed in 2003.
102	San Diego	Poway	18/03/2001	Marine Corps Air Station Miramar, Approx 0.4 air mile WNW of junction of Miramar Way and Kearny Villa Rd, San Diego. Pool Id: Gg3+ 31.	DOD-MCAS MIRAMAR	460	Several pools in this area receive a fair amount of runoff irrigation water from adjacent landscaped area.	Unknown number of plants observed in 2001.
103	San Diego	Del Mar	16/04/2003	Lopez Ridge, N of Calle Cristobal, between Camino Santa Fe and Camino Propico, San Diego.	CITY OF SAN DIEGO	415		No plants observed in the B8 pools in 1979 and 1986. 1 plant observed in 2003.
104	San Diego	Del Mar	17/04/1986	Lopez Mesa, along Calle Cristobal, between Brenner Springs Way and Camino Miranda, northern San Diego.	PVT	410	Pools have been destroyed by development.	Observed in 1979. Pools extirpated by development by 1986.
105	San Diego	Del Mar	31/05/2005	Los Penasquitos Canyon Sewage Disposal Ponds, 0.1 mi SW of the west end of Ragweed St, SE of Park Village Rd, San Diego.	CITY OF SAN DIEGO	220	Recycled water line to be constructed nearby	13 plants observed in 2005.
106	San Diego	Oceanside	1985	Camp Pendleton Marine Corps Base, East of I-5, NW of Intersection of Jacinto Rd and Wire Mountain Rd. Bauder Pool Complex Y5.	DOD-CAMP PENDLETON MCB	120	Pools near road with tire tracks. Portions may have been extirpated by development.	Common in over 50% of these pools in 1984 &1985.

EO	County	Quad	Date (D/M/Y)	Location	Land Manager	Elev (ft)	Threats	General Comments
107	San Diego	Las Pulgas Canyon	1985	Camp Pendleton Marine Corps Base; just N of French Cyn and the rifle range, NE of I-5.	DOD-CAMP PENDLETON MCB	100		Common in over 50% of these pools in 1984/1985.
108	San Diego	Santa Ysabel	01/08/2009	just NW of Kessler Flat; Above 7 mi marker on Eagle Peak Rd, About 5.5 mi S of the intersection Hwy 78 & 79.	USFS-CLEVELAND NF	2887		Only source of information for this site is a 2009 Hirshberg collection. Annotated to *E. aristulatum* var. *parishii* by J. Rebman; Rebman notes that this site is "out of range and elevation but has acuminate fruit scales and entire branches."
109	San Diego	La Mesa	1979	SE portion of Montgomery Field Airport, San Diego.	UNK	425		Observed in a single pool in this area in 1979.
110	San Diego	Imperial Beach	21/02/2003	Otay Mesa, N of Moody Canyon, 0.2 to 0.4 air mi ESE of intersection of Hawken Dr and Otay Mesa Rd, San Ysidro.	PVT	450		Site contains a mixture of unnatural ruts from historic grading, recently created basins, and a few natural depressions. In 3 natural and 3 created pools in 2003.
111	San Diego	Del Mar	06/05/2004	Along Arjons Dr. S of Carroll Canyon, About 1.5 air miles SSW of Mira Mesa.	PVT	430	Dumping and vehicle damage (1986). Development.	Observed in 1979. Common in 10-50% of the pools in 1986. Observed in 15 basins in 2003 and 2004.

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Poa atropurpurea

Poa atropurpurea Scribn. (San Bernardino blue grass)

Management Status

Federal: Endangered

California: None

Heritage Rank: G2; S2.2 (California Natural Diversity Database)

California Native Plant Society (2001): List 1B; R-E-D Code 2-2-3 (California Native Plant Society 2001).

Critical habitat has not been designated or proposed for this taxon.

General Distribution

Poa atropurpurea is reported from 22 occurrences in the San Bernardino Mountains of San Bernardino County and the Palomar and Laguna Mountains of San Diego County (California Natural Diversity Database 2004). In addition, several other occurrences are noted in the table below.

Distribution in the Planning Area

All occurrences of *Poa atropurpurea* are on or adjacent to the San Bernardino and Cleveland National Forests. In the San Bernardino Mountains, *Poa atropurpurea* is restricted to an eight mile radius (Krantz 1981). Populations on the San Bernardino National Forest occur in the Big Bear area from Holcomb Valley to the east slope of Sugarloaf Mountain. On the Cleveland National Forest, one occurrence is located in Mendenhall Valley south of Palomar Mountain, four are in the Laguna Mountains and one is at the southwest corner of Bear Valley, south of the town of Pine Valley (California Natural Diversity Database 2004).

Taxonomy and Natural History

Poa atropurpurea is a monocotyledon in the grass family (Poaceae). It is often found with Kentucky bluegrass (*Poa pratensis*), from which it may be distinguished by its short narrower inflorescences and floral features (Soreng 1993). *Poa atropurpurea* has purple panicles at anthesis and tends to flower earlier in the year than Kentucky bluegrass (Sproul and Beauchamp 1979; Curto 1992). Curto (1992) noted that some populations of Kentucky bluegrass (*Poa*

pretensis) in Laguna Meadow and Mendenhall Meadow show characteristics of *Poa atropurpurea* and may represent hybrid introgressions.

Poa atropurpurea is a dioecious rhizomatous perennial grass that flowers between April–June (California Native Plant Society 2001). Unless it is in flower, this plant is virtually indistinguishable from the surrounding grasses. Until recently, only pistillate (female) plants were known from herbarium specimens collected in the southern portion of its range, while both staminate (male) and pistillate inflorescences have been collected in the San Bernardino Mountains (Curto 1992). However, Hirshberg (1993, 1994) observed and collected voucher specimens of several staminate inflorescences during surveys of Laguna Meadow in the mid-1990s.

Habitat Description

Poa atropurpurea occurs in montane meadows and seeps at elevations of 4,400–8,000 ft (1,360–2,455 m) (California Native Plant Society 2001). The species is usually found on the edges of wet meadows in open pine forests and grassy slopes on loamy alluvial to sandy loam soils (California Natural Diversity Database 2002). *Poa atropurpurea* tends to occupy somewhat open areas on clay soils with less competition from more mesic species, such as *Poa pratensis*, *Carex* spp., and *Juncus* spp. These areas are often adjacent to wetter *Carex*/forb vegetation series and *Artemisia tridentata* or *Pinus jeffreyi*. At Bluff Lake, soils appear to be of a granitic, rather than clay, composition (Krantz 1981). Within meadows, *Poa atropurpurea* may prefer small rocky microhabitats (Reiser 1994).

An estimated 55,446 acres (22,438 hectares) of montane meadows occur in southern California, of which approximately 38% is occurs on public lands. The largest montane meadows and meadow complexes on and adjacent to National Forest System lands in southern California are on the Los Padres National Forest and on the Cleveland National Forest in the Laguna Mountains and near Mount Palomar. The majority of the large meadows in San Diego County are located on private lands (e.g., Cuyamaca, Mendenhall, French, and Dyche meadows).

There are approximately 4,430 acres of meadow habitat distributed in the San Bernardino and San Jacinto mountains (USDA Forest Service 2002).

Meadow habitat is sensitive to activities that alter hydrology, remove vegetation, or cause soil erosion, especially during the winter and spring when the ground is most saturated. In meadow systems, particularly those on steeper slopes, erosion removes topsoil and fine-textured alluvium, resulting in gully formation. The resulting channelized surface runoff causes increased erosion and stream incision, channeling water away from the meadow and effectively lowering the water table. Over time, increased drainage of meadow soils can lead to a shift in floristic composition to more drought-tolerant species and tree and shrub species. Grazing and trampling by livestock and other ground disturbances by recreational users such as hikers, mountain bikers, and vehicle use off classified roads encourage the establishment and spread of nonnative species which degrade meadow habitat (USDA Forest Service 2003). Meadows in the Laguna Mountains have been heavily grazed. These meadows typically support a variety of native annuals, herbaceous perennials, and Eurasian grasses (Reiser 1994).

Occurrence Status

At the southern end of its range, *Poa atropurpurea* populations appear relatively stable. Although Curto (1992) surveyed previously reported *Poa atropurpurea* locations in Laguna Meadow during June 1992 and found no plants at any of them, Hirshberg (1994) found sizeable populations (30–500 plants) at several of those same sites during April–May of 1994 indicating that timing of surveys is crucial for locating this species. Additional occurrences in Mendenhall Meadow on the Cleveland National Forest were located and mapped in 2001 (Winter, pers. comm.). Occurrences in the San Bernardino Mountains appear to be declining, primarily as a result of development pressures (Reiser 1994).

The following table shows the number of occurrences recorded in the literature, the number of plants reported to be present, and the general location of these occurrences.

OCCURRENCE DATA – *Poa atropurpurea* (San Bernardino bluegrass)

Occurrence No. (CNDDB)	No. of Plants	Year Reported	Location/Land Owner	County
1	U	1989	N shore of Baldwin Lake on both sides of Hwy 18. San Bernardino Mtns. Growing in meadow w/ *Sidalcea pedata, Thelypodium stenopetalum,* other sensitive spp. Some portion of population may be growing w/in adjacent pebble plain. Upstream development threatens springs. ORVs, illegal woodcutting and quartzite collection are management problems. SBNF/CDFG/TNC/PVT.	SBD
2	U	1988	S shore of Big Bear Lake, btw. Eagle Point and Stanfield Cutoff. Meadow vulnerable to trespassing and ORV damage. Wet meadows and springs near lake surrounded by Jeffrey pine forest. w/ *Sidalcea pedata, Thelypodium stenopetalum,* 13 other sensitive plants. PVT/TNC.	SBD
4	100 in 1994 at S end of meadow	1994	Mendenhall Valley, S of Palomar Mountain. PVT owner considering use of herbicides to rid meadow of wild roses (1981). 2 mi. long meadow w/ *Linanthus dianthiflorus, Limnanthes gracilis parishii, Ranunculus californicus, Carex* spp. Land used for cattle grazing. PVT/CNF. This is partially Cleveland National Forest. Additional occurrences	SD

			on FS land within Mendenhall Meadow were located and mapped by CNF in 2001, grazing has been delayed until after seed set and plants appear to be doing well (Kopp)	
5	8 in 1976 just E of Big Laguna Lake; 50 in 1993 at S end of occ.; > 530 in 1994 in 5 patches	1976	Lower end of Laguna Meadow, from just N of Los Rasalies Ravine to S end of Big Laguna Lake, W of Mount Laguna. Grassland and seasonally wet meadow w/ *Carex, Juncus, Ranunculus californicus, Sidalcea malvaeflora.* 5 patches. Grazing, recreational hiking. PVT in CNF. This is now Cleveland National Forest land. Old occurrences have been found, grazing season delayed until after seed set (Kopp).	SD
8	0 in 1978, 1992	1992	Low places near W edge of Filaree Flats, Laguna Mtns. Unknown when last seen. Land owner: CNF	SD
10	U	1986	ca. 1.5 mi. E of Holcomb Valley, San Bernardino Mtns. Wet meadow surrounded by Ponderosa pine forest. *Artemisia nova* dominant w/ *Eriogonum kennedyi, Antennaria dimorpha, Elymus smithii, Chryosthamnus viscidiflorus, Carex, Juncus, Bouteloua, Muhlenbergia, Senecio, Sporobolus, Sitanion, Stipa.* Rare associates = *Thelypodium stenopetalum, Sidalcea pedata.* SBNF.	SBD
11	2 in 2000	1988	Holcomb Valley, ca. 3 mi. N of Big Bear Lake, San Bernardino Mtns. Meadow w/ grasses and sedges on sensitive pebble plain-type substrate. Rare associates = *Taraxacum californicum, Pyrrocoma uniflora gossypina, Castilleja lasiorhyncha, Perideridia parishii.* Also w/ *Juncus bufonius, J. kelloggii, Carex praegracilis* at edge to *Artemisia tridentata* scrub. Drainage through meadow is cutting banks and may result in lowered water table. CDF may help correct problem. Grazing has eliminated or reduced sensitive species while encouraging exotics. Meadow is currently fenced, monitored, and patrolled. SBNF/PVT.	SBD
12	< 10,000 in	1983	Cienega Seca, 1 mi. SW of Onyx Peak,	SBD

	1983		San Bernardino Mtns. Wet montane meadow; heavy soils w/ Saragosa quartzite gravel. w/ *Taraxacum californicum, Castilleja cinerea, Juncus, Carex, Artemisia tridentata, Cirsium tioganum.* Human disturbance and hydrologic changes. Grazing also a threat. Site proposed as RV campground. PVT in SBNF. Owned by the Boy Scouts. Now managed by the Wildlands Conservancy in 2003 (Kopp)	
13	U	1977	E edge of Bluff Lake. Meadow at edge of lake w/ *Ranunculus californicus, Juncus balticus, Achillea millefolium, Trifolium variegatum, Lupinus confertus, Poa pratensis, Sidalcea pedata, Castilleja lasiorhyncha, Perideridia parishii parishii, Taraxacum californicum*. Past uses include camp development and grazing. PVT in SBNF. The Wildlands Conservancy.	SBD
14	U	1977	Town of Big Bear Lake, just S of Meadow Park. *Packera bernardina* nearby. PVT.	SBD
16	U	1984	Presbyterian Conference grounds W to S shore of Metcalf Bay, Big Bear Lake. In meadows and grasslands at 6720-6800 ft. w/ *Sidalcea pedata.* Urbanization and grazing. PVT.	SBD
17	17 female plants, 3 males in 2000	2000	E of Big Bear City, Pan Hot Springs Area. Along Hwy 18 at W end of Baldwin Lake. Meadow w/ *Sidalcea pedata, Thelypodium stenopetalum,* 6 other sensitive plants, incl. *Mimulus purpureus, Castilleja cinerea.* Contains high densities of *Poa atropurpurea.* Horse grazing, roadside dumping. City of Big Bear.	SBD
18	U	1981	Shay Meadow, near SE end of Big Bear Blvd. Big Bear City. Open meadow w/ alkaline to moderately drained alluvial clays. w/ *Carex athrostachya, Agropyron intermedium, A. desertorum, Trifolium variegatum, Trifolium wormskioldii.* Also w/ *Taraxacum californicum. Poa atropurpurea* absent where non-native *Agropyron* spp. is most prevalent. In	SBD

			grassland. PVT.	
19	U	1981	Between Aeroplane Ln and Big Bear City Airport. Big Bear City. Open meadow on alluvial clays w/ *Artemisia tridentata, Ranunculus californicus, Achillea millefolium, Carex athrostachya, Taraxacum californicum, Perideridia parishii parishii.* Urbanization, grazing, hydrologic alteration. Incl. former occ. 20. PVT.	SBD
21	U	U	Moonridge, near golf course and ski areas, San Bernardino Mtns. Where Rathbone Creek and Deer Canyon drainages meet. w/ *Juncus, Carex,* just outside area w/ *Artemisia ludoviciana.* Urbanization, golf course, ski areas, and grazing are threats. Unknown when species was seen. PVT.	SBD
22	U	1981	Wildhorse Spring, 3.4 mi. SE of (town of) Woodlands. San Bernardino Mtns. Sandy clay soil. Wet meadow w/ *Juncus bufonius, Carex praegracilis, Potentilla wheeleri, Taraxacum californicum.* Surrounded by *Pinus contorta, Abies concolor, Juniperus occidentalis.* ORVs and past grazing. SBNF.	SBD
23	U	U	Erwin Lake, just E of (town of) Woodlands, at end of Meadow Lane. Unknown when species seen. PVT.	SBD
24	U	1984	E end of Erwin Lake, ca. 1 mi. E of town of Woodlands, San Bernardino Mountains. Alkaline wet meadow w/ high densities of *Thelypodium stenopetalum,* 11 other sensitive plants. Nearly pristine meadow. Wintering bald eagle and waterfowl habitat. Mostly undisturbed and fenced, no hunting allowed. Grazing confined to non-sensitive areas, but no formal protection. PVT. Area surrounding lake bed being developed as Erwin Ranch community and lots on habitat are for sale in 2003.	SBD
27	> 500 in 1994	1994	N end of Laguna Meadow, extending N ca. 0.7 mi. from the N end of Laguna Lake, Laguna Mtns. In seasonally wet meadow w/ *Ranunculus californicus,*	SD

			Sidalcea malvaeflora, Juncus spp., *Carex* spp. CNF.	
28	50 in 1993; 50-75 in 1994	1993	Between Little Laguna Lake and El Prado Meadow, ca. 1.2 mi. S of Oasis Spring. Laguna Mtns. Just N of Little Laguna Lake and just E of a fenced rock outcrop. In wet montane meadow w/ *Carex* spp., *Juncus mexicanus, Poa pratensis*, and near *Ranunculus californicus.* Hiking and grazing are threats. CNF.	SD
29	U	1994	SW corner of Bear Valley, ca. 1.9 mi. SSE of Long Valley Peak summit, S of Pine Valley. In wet meadow w/ *Juncus mexicanus, Carex* spp., *Aster* spp., and *Poa pratensis.* Plants are located in the SW corner of Bear Valley Meadow. One 20X20 patch of plants observed in 1994; acc. to M. Curto, plants could all be one clone. Entire meadow was not surveyed, and occ. could be more extensive. Cattle grazing. CNF.	SD
805758 (CalFlora)	U	1989	San Bernardino Mts., Bear Valley region, in Jacoby Cyn., along Holcomb Valley Rd. (the Rd. from Baldwin Lake to Arrastre Flat), SW ¼ T3N/R1E/S36, elev. 7300 ft. (Taylor 10294/CalFlora)	SBD
1835997 (CalFlora) / UCR44561 (SMASCH)	U	1981	Mendenhall Meadow E of the dam (montane meadow) T10S/R01E/S12, elev. 1372m.(Dias/CalFlora)	SD
UC1574111 (SMASCH)	U	1981	Cleveland National Forest, Laguna Meadow (montane meadow near xeric margins), T25S/R5E/S15 (Diaz/CalFlora)	SD
UCR107888 (SMASCH)	U	1996	Laguna Mts., at a spring 1mi. N of the check dam on Big Laguna Lake, 0.5 mi. from the lake, Lat:32.88333/Lon: –116.4666, elev. 1677m (Hirshberg/CalFlora)	SD
UC573889 (SMASCH)	U	1937	E. end of Big Bear Lake, T2N/R1E/S16, elev. 6800 ft. (Yates/CalFlora)	SBD
UCR20090 (SMASCH)	U	1979	San Bernardino Mts., Big Bear Lake, Eagle Point, in meadow N of the junction of Swan and Oriole Drives, annually moist meadow, currently being developed	SBD

			for condominiums, T02N/R1E/S20, elev. 2058m (Krantz/CalFlora)	
UCR27082 (SMASCH)	U	1981	San Bernardino Mts., wet meadow, upper Holcomb Valley, Caribou Creek area, T03N/R01E/S33 (Krantz/CalFlora)	SBD
UCR48004A (SMASCH)	U	1987	San Bernardino Mts., Foxfarm Rd. vicinity of Big Bear Lake, in a clay meadow, T02N/R01W/S21, elev. 2066m (LaPre/CalFlora)	SBD

U = Unknown

** = an occurrence number has not been assigned*

SBNF = San Bernardino National Forest

CNF = Cleveland National Forest

SBD = San Bernardino County

SD = San Diego County

Threats

The primary threats to this species are prospecting, dispersed recreational use, mountain bike use in meadow habitat, livestock grazing, and actions that alter hydrological regimes.

Poa atropurpurea is threatened by habitat destruction and alteration resulting from urban and recreational development, hydrological alteration, grazing by livestock, and competition from invasive nonnative plant species (USDA Forest Service 2000). Hybridization with a nonnative taxon has been speculated, however this has not been documented.

In 1998, wet meadow habitat in the Wildhorse Meadow area on the SBNF benefited by the removal of over 100 feral burros in the Big Bear area. One report of burros seen in occupied *Poa atropurpurea* habitat within Wildhorse Meadow was documented in 2004 (Eliason pers. comm.). Occupied habitat of *Poa atropurpurea* is managed for "no burro presence". If burros move into these areas, they will be removed; however this will depend on funding and staffing, so some low level of grazing impacts may periodically occur if burros stray into the habitat (USDA Forest Service 2000).

Approximately 81% of known *Poa atropurpurea* occurrences are under claim for mining or are on private lands with limited protection (USDA Forest Service 2000). About 91% of meadow habitat for this species has been eliminated since the turn of the 20th century. Approximately 70% of the remaining meadow habitat is unprotected and is consequently subject to development, wildlife viewing walks, fragmentation from off-highway vehicle (OHV) traffic, and grazing (U.S. Fish and Wildlife Service 1998).

A recovery plan for *Poa atropurpurea* is being developed but is not yet complete. It is likely that proper management of National Forest System lands will be crucial to the recovery of this species through protection of known occurrences, restoration/ reintroduction into historical and protected habitats, acquisition of lands that support occurrences or that are suitable for recovery efforts, and additional data collection and research to determine management needs (USDA Forest Service 2000).

The USDA Forest Service (2000) has identified site-specific threats to *Poa atropurpurea*. Limited protection measures have been taken to reduce impacts on montane meadows. Measures at specific meadow complexes are listed below (USDA Forest Service 2000).

The Belleville Meadow site, on the San Bernardino National Forest, is at risk from a variety of impacts and influences. Belleville Meadow has been drastically altered and manipulated through a century of mining, heavy grazing, and recreation activities. Without a withdrawal of mineral entry to protect unclaimed portions of the meadow and elimination of mountain biking and prospecting, this occurrence is at significant risk.

Belleville Meadow is a popular prospecting site and several gold claims overlap the *Poa atropurpurea* occurrence. Effects to occupied habitat under claim do not occur at this time, and a site specific analysis would be completed prior to approval of a Plan of Operation, however effects from prospecting do occur.

Direct impacts may result from ground-disturbing activities (*e.g.*, digging, sluicing, panning, storing/piling soil). Indirect impacts may occur as hydrological features of the landscape are changed (USDA Forest Service 2000). In addition, Forest Service roads essentially encircle Belleville Meadow, continuing to alter meadow hydrology and degrade the meadow habitat. The *Poa atropurpurea* occurrence is bisected by Forest Roads 3N05 and 3N16. The occurrence along 3N05 is crossed by trails between the adjacent Holcomb Valley Campground and Gold Fever Trail sites.

In this location and the Belleville Cabin site, fencing, signing to redirect trail use outside of habitat and additional patrol to maintain structures has been successful in protecting habitat. Occupied habitat continues to be affected however, south of Belleville Meadow along Caribou Creek by mountain bike use despite installation of physical barriers and signing to protect the area.

The Wildhorse Meadow site, also on the San Bernardino National Forest, is relatively well protected. It was fenced in the past to exclude cattle when the area was part of an active grazing allotment. The fence continues to protect occupied habitat from vehicle use off classified roads. The meadow itself experiences little to no recreation use. There are some meadow hydrology problems, partly from past overgrazing and partly from Forest roads that encircle almost the entire meadow. Past erosion control projects to reduce the amount of downcutting and dewatering in the meadow include a series of gabions that are still in place. The gabions were installed because of erosion resulting from roads at the top and bottom of the

meadow. This site offers some potential restoration opportunities in the meadow as well as in the connected stringer meadows.

All *Poa atropurpurea* sites on the Cleveland National Forest are fairly well-protected at this time, although many of these sites have been disturbed in the past. Historical disturbances include cattle trails, telephone line trenching, and soil removal for dam construction. Sheep grazing occurred in Laguna Meadows for 10-20 years until the 1880's; after that period, cattle grazing occurred (Sproul and Beauchamp 1979). Grazing is the only current activity that may be affecting the three main populations. In all areas the season of use has been adjusted to exclude grazing until after *Poa atropurpurea* has flowered and set seed.

Conservation and Management Considerations

The following list of conservation practices should be considered for *Poa atropurpurea*:

Monitor fence lines and repair as necessary.

Continue implementing recommendations listed in CNF Meadow Habitat Management Guide, and the 2002 SBNF Meadow Habitat Management Guide.

Implement actions to the greatest extent practicable in the USFWS Recovery Plan once it is completed.

Apply the habitat suitability criteria and detection protocol developed for this taxon to surveys at the project level.

Continue surveys for *Poa atropurpurea* on NFS lands on the San Jacinto District.

Survey all new occurrences of *Poa atropurpurea* and any occurrences that have not been visited in the past ten years, and record occurrence status, habitat condition, and threats.

Collect a herbarium voucher specimen of *Poa atropurpurea* to document new occurrences or to verify a historical occurrence if the occurrence is not known to have been documented in at least ten years prior.

Map known and new occurrences of *Poa atropurpurea* in the area using NRIS data collection standards, and incorporate these occurrences into the Sensitive Plant Atlas.

Evaluation of Current Situation and Threats on National Forest System Lands

On the Cleveland National Forest, *Poa atropurpurea* is considered to have moderate vulnerability and the trend is increasing (Stephenson and Calcarone 1999). On the San Bernardino National Forest *Poa atropurpurea* is considered to have high vulnerability and the trend is declining (Stephenson and Calcarone 1999). *Poa atropurpurea* is 1) is endemic to southern California, 2) is restricted to montane meadows, a rare habitat type, 3) is present within mining claims, 4) is present within a high use recreation area, 5) is affected by unclassified trail,

6) occurs within active grazing allotments, and 7) is affected by changes in hydrological regimes such as roads that bisect habitat.

On the Cleveland National forest, livestock grazing has been delayed until after seed set for the last ten years. On the San Bernardino National Forest, fencing and signing to redirect use away from occurrences in Belleville Meadow and monitoring and completion of repairs in a timely manner have been successful. There is a possibility that future mining could affect the Belleville occurrence, however the probability is low. Habitat degradation caused by unclassified trail use, mountain biking within meadow habitat and changes to hydrological regimes appear to be the largest threats at this time. Implementation of strategies listed in both the CNF (USDA Forest Service 1991) and SBNF (USDA Forest Service 2002) Meadow Habitat Management Guides will provide continual protection for this species.

Based upon the above analysis this species has been assigned the following threat category:

5. Uncommon, narrow endemic, disjunct, or peripheral in the Plan area with substantial threats to persistence or distribution from Forest Service activities.

Viability Outcomes for National Forest System Lands

Predicted Outcomes by Alternative

1	2	3	4	4a	5	6
C	B	B	C	B	C	A

Poa atropurpurea is listed under the Endangered Species Act of 1973, as amended, as endangered, which assures that any new project proposed in or near its habitat will undergo considerable analysis and be subject to consultation with the USFWS at the site-specific level.

The viability of this species is primarily tied to protection and management of meadow habitat. To provide for viability and recovery of this species, some of the most important habitat for this species must be clearly and substantially protected.

With implementation of the Meadow Habitat Management Guides on the Cleveland and San Bernardino National Forests and strategies proposed to the greatest extent possible when the USFWS Recovery Plan is completed, viability for this species on NFS lands is secure.

Land use zoning, recommended special area designations and Standards were used in predicting viability outcomes on NFS lands. On the Cleveland National Forest, under Alternative 1, the Laguna and Mendenhall occurrences would be managed as Back Country Non-Motorized and Back Country respectively. Under Alternatives 2, 3, 4 and 4a, both locations would be managed as Back Country Non-Motorized, with a small amount of habitat managed as Back Country in Alternative 3. Under Alternative 5, both locations would be managed as Back Country. Under Alternative 6, both locations would be managed as Critical Biological zones.

On the San Bernardino National Forest, the Belleville and Wildhorse Meadow occurrences under all alternatives except 4a and 6 would retain Back Country Motorized management. In 4a, the Belleville occurrence is zoned Back Country Motorized and Back Country Motorized Use Restricted. In Alternative 6, the Wildhorse Meadow occurrence is zoned as Back Country Non-Motorized; Belleville Meadow would be managed under a combination of Backcountry Motorized and Backcountry Non-Motorized zoning.

In Alternatives 2, 3, 4a and 6, the occurrence at Wildhorse Meadow on the SBNF would receive additional protection by establishment of the Wildhorse Meadow Research Natural Area. Under Alternatives 3 and 6 the Wildhorse occurrence would be managed by designation of the Wildhorse Special Interest Area, a designation that would provide a lower level of habitat protection than a Research Natural Area. Designation of this area as both an RNA and an SIA is conflicting use; Forest leadership prefers that the RNA be established in both alternatives. In alternatives 2,3,4, 4a and 6, The suitable habitat acres within the South Baldwin Lake and the Sugarloaf Meadow Critical Biological zones have a high likelihood of being occupied by *Poa atropurpurea* and would receive long-term protection within this zone.

Under Alternative 1, current management would be retained. No additional habitat protection would be provided under special designations or zoning. Under Alternative 4, impacts associated with higher levels of expected recreational use would be minimized by expected increases in management control and monitoring, however because the Wildhorse Meadow Research Natural Area would not be designated under this alternative, the likelihood of persistence for this species under this alternative is lower. Under Alternative 5, there would be increased threats across the range of the species as a result of an increase in road and trail designation and use and additional water diversions/extractions. Alternatives 2, 3, and 4a would provide increased protection as the Wildhorse RNA is established. The highest level of protection and the most potential for recovery would occur under Alternative 6, as Critical Biological zones would become established in Laguna and Mendenhall Meadows on the Cleveland National Forest and the Wildhorse Meadow Research Natural Area would become designated on the San Bernardino National Forest. Recovery of this species is expected to occur sooner under Alternatives 3 and 6 due to the emphasis on protecting ecological integrity.

Several Standards are specifically applicable to protection of this taxon and were also used in predicting viability outcomes on NFS lands. On the CNF, two Standards are applicable. The current Standard in Alternative 1 that delays grazing in occupied *Poa atropurpurea* habitat until after seed set has been brought forward under Alternatives 2-6 as CNF Place Standard S11. The Standard CNF S16 limits mountain biking and horseback riding to system roads and trails within the Laguna Mountain Recreation Area. This would help to protect occurrences within Laguna Meadow from effects of dispersed recreation.

On the SBNF, two Standards are applicable: the Forest-wide Standard S33 states that within Special Interest Areas, activities and discretionary uses are either neutral or beneficial for the resource values for which the area was established. Short term adverse impacts to these resource values can be accepted if such impacts will be compensated by the accrual of long-term benefit. This would apply to 67 acres of occupied habitat within the existing North Baldwin Holcomb Valley SIA. Under Alternatives 2-6, this Standard would provide a higher level of protection to

those taxa within the existing SIA when new projects are proposed. Forest-wide Standard S35 requires that motorized and non-motorized vehicle travel is restricted to Forest system roads and trails and limited areas that are designed for vehicle use. This would provide protection to the Belleville Meadow occurrence that is often affected by mountain bike use within habitat. Forest-wide riparian and recreation management, ground water extraction and mining standards are also important across both Forests and were used in predicting these outcomes.

Use of additional Standards that relate to riparian areas, mining, dispersed recreation and special use management related to water withdrawal were also important in predicting outcomes. Implementation of actions listed in CNF and SBNF Meadow Habitat Management Guides and strategies suggested in the USFWS Recovery Plan once it is finalized also factor in to this outcome. The proposed Wildhorse RNA is essential for favorable viability outcomes when high levels of recreational use are promoted.

Viability Outcomes for All Lands Within Range of the Taxon

Predicted Outcomes by Alternative

1	2	3	4	4a	5	6
C	C	C	C	C	C	B

Poa atropurpurea is reported from only 21 occurrences in the San Bernardino Mountains of San Bernardino County and the Palomar and Laguna Mountains of San Diego County (California Natural Diversity Database 2002). Due to past and current urban development in habitat, protection of this species will likely be dependent on NFS management. Occurrences on private lands are being extirpated by creation of housing developments; other sites are degraded by grazing, vehicle use, recreational use, dumping, and hydrologic alteration (California Natural Diversity Database 2002). As private land development increases, the demand for water and new diversions/extractions increases. This in turn increases the potential for changes in hydrological regimes that could affect wet meadow habitat. By maintaining the current distribution of *Poa atropurpurea* on National Forest system lands, no alternatives are expected to contribute substantial adverse cumulative effects that would cause the species to suffer a decline in its overall distribution.

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